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Emerging Policy Issues

LOCALISATION BARRIERS TO TRADE

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OECD

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Abstract

Emerging Policy Issues: Localisation Barriers to Trade

Susan Stone, James Messent and Dorothee Flaig
OECD

Despite the predominately negative evidence of the impact of local content requirements on trade, they continue to play a significant role in trade policy. This has been particularly true since the financial crisis of 2008. The work presented here provides new evidence of the detrimental effects these policies have on the imposing country's own economy. Most empirical studies have focused on the long run inefficiencies associated with LCRs, notably in the effected sector. This paper highlights the costs to other sectors in the economy, the different impacts on intermediate versus final demand, and the declines in trade in third-party economies, despite not engaging in direct trade with the imposing country. Economies imposing LCRs experience a decrease in exports in non-LCR effected sectors and a growing concentration of domestic activity in a few targeted sectors, undermining potential growth and innovation on a broader scale. The paper concludes by offering policy alternatives.

Key words: Local Content Requirements, Trade Policy, Impacts, CGE

JEL: F14, F68, F47

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Key messages

- This study focuses on the quantification of the impact of local content requirement on trade. It does not account for the effect of LCR measures on investment. LCRs related to trade reduce overall trade flows, even in non-implementing economies, potentially reversing the trend of greater economic integration and dampening global growth.
- Total imports and total exports decline in every region as a result of LCR policies. The quantifiable *net* impact of even a small number (8% of all measures examined) of trade-related LCRs, is to shrink world imports by USD 12 billion and world exports by nearly USD 11 billion.
- Overall, even these few measures lead to welfare losses for the world economy of USD 5 billion or 0.07% of global income.
- A major negative effect of LCRs is in the implementing country's own economy, introducing production and trade distortions that aggravate rather than address the underlying problems related to the policy objectives.
- LCRs reduce an economy's international competitiveness. In almost all cases where LCRs are introduced, final goods exports are reduced from 0.05% to as much as 5.0%.
- LCRs undermine domestic economic diversification by reducing input availability and output in non-LCR industries.
- Employment is generally negatively effected in the non-targeted sectors and in many cases, unskilled labour experiences as much as three times the declines as skilled workers.
- Overall, LCRs distort input markets and potentially inhibit innovation by removing access to technologically advanced inputs, undermining efficiency gains from global value chains.
- A well designed set of horizontal and selective policies targeted at specific barriers, such as the business operating environment and information asymmetries, can address both immediate and longer term objectives with fewer potential trade distortions.
- The impact of Government Procurement LCRs will depend on a number of factors including the degree of market power and the degree of foreign contestability in the sector. However, the basic inefficiencies that these LCRs give rise to are as much present in this sector as any other.
- Policies relating to the localisation of data are growing in number and have the potential to undermine global business models and efficiency across the economic spectrum.
- Further work is needed to analyse the medium to long-term impact of LCRs on Government Procurement and Data Localisation, as well as on investment, which is more substantially affected by LCRs than trade.

Acronmyns

AGR	Agriculture industry
ARRA	American Recovery and Reinvestment Act
CGE	Computable General Equilibrium
EC	European Commission
EPA	Environmental Protection Agency
FDI	Foreign Direct Investment
GATS	General Agreement on Trade in Services
GATT	General Agreement on Trade and Tariffs
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GP	Government Procurement
GPA	Government Procurement Agreement
GTA	Global Trade Alert database
GTAP	Global Trade Analysis Project
GVC	Global Value Chain
HS	Harmonised System
ICT	Information and Communications Technology
IPR	Intellectual Property Rights
IT	Information Technology
ITA	Information Technology Agreement
LC	Local Content
LCR	Local Content Requirements
MFN	Most Favoured Nation
MNEs	Multinational Enterprises
MW	Mega Watts
NTM	Non-Tariff Measure
PISA	Programme for International Student Assessment
PPI	Producer Price Index
R&D	Research and Development
ROW	Rest of the World
RTA	Regional Trade Agreement
SME	Small and Medium Enterprises
SPS	Sanitary and Phytosanitary
TAD	Trade and Agriculture Directorate

TBT	Technical Barriers to Trade
TCF	Textiles, Clothing and Footwear
UMPP	Ultra-Mega Power Projects
UNCTAD	United Nations Conference on Trade and Development
USTR	United States Trade Representative
WEF	World Economic Forum
WIOD	World Input-Output Database
WITS	World Integrated Trade Solution
WPEC	Work Programme on Electronic Commerce
WTO	World Trade Organization

Executive Summary

The term "localisation barriers" applies to a range of measures that favour domestic industry at the expense of foreign competitors. While many of the applications of localisation barriers have been around for a number of years, they are being applied with increasing frequency. The fastest growing of these measures are local content requirements (LCRs).

LCRs, especially those applied in the technology sector, have lately attracted a great deal of attention. A large study on the proliferation of these measures, their objectives and potential effects, including detailed case studies, was recently released by The Peterson Institute. The OECD is also undertaking a study on the role of LCRs in green technology while the number of papers addressing concerns about localisation of data has increased almost exponentially. Sector specific studies reviewing the benefits and costs, as well as the effectiveness of LCR policy design have been undertaken for the renewable energy, automobile sector and the oil and gas sector to name a few. These studies have generally concluded that while LCR policies may achieve certain short run objectives, they undermine industrial competitiveness over the long run.

This report seeks to analyse a range of trade-related LCRs (leaving those that are purely investment-related aside) that have been put in place since the onset of the global financial crisis in 2008 and are still in-force. Using METRO, the OECD Trade Model, it also quantifies for the first time the impact of a subset of these measures related to restrictions imposed on input markets. For measures related to government procurement and data localisation where existing data prevents, at this stage, robust quantitative analysis, the paper provides a qualitative assessment of the effects of local content requirements. Further work is planned specifically in the area of government procurement and data flows.

A finding of the report is that while the crisis served as an impetus for the adoption of many of the LCRs, they remain in place largely with a view to supporting industrial and technological development and the associated employment gains they purportedly could bring. The main reasons cited for localisation measures related to data, on the other hand, relate to privacy or security concerns.

Impact

The METRO Model allows for the quantification of the impact of a subset of trade-related LCR measures that affect industry input decisions. It provides evidence that these LCRs have caused global imports and total exports to decline in every region, even in those regions not implementing an LCR. There is a loss in international competitiveness as measured by the reduction in exports in non-LCR affected sectors in imposing economies. Further, as LCR affected sectors consume more domestic resources, other sectors are forced to reduce production, or increase imports, leading to a concentration of domestic economic activity. This undermines the growth and innovation opportunities that come from a diverse economy.

Given that the LCRs examined are primarily targeted at input demand, the vast majority of the reduction in trade flows is in intermediates trade. This negative outcome for trade in intermediates is particularly alarming when considered in the context of Global Value Chains (GVCs). The results presented in the report imply that LCRs can lead to increasing economic isolation, undercutting important gains made from the rise of GVC activity. Reducing trade in intermediates in particular,

threatens to lower productivity and reduce connectivity across the globe. While final goods are affected, the model shows that 80% of the decline in trade comes in intermediate goods. Ironically, it is only through the opportunity to access international markets that households, and other non-LCR targeted sectors are able to mitigate the losses inflicted by the LCR policies.

Imposing LCRs raises domestic production costs to the industry targeted. In all but one of the cases examined, the LCR-affected sectors increased the domestic price of their good. The increase in production costs leads to an increase in output prices. The increased prices in turn raise costs to producers further along the production chain, reducing the competitiveness of industries across the economy. The size of these efficiency losses in the market place are proportional to the additional domestic inputs required under the LCR.

The loss in competitiveness of the targeted industry leads to a substitution away from these now more expensive goods in the rest of the economy. While the LCR forces firms to buy intermediate inputs from domestic sources, households are under no such restrictions. As the LCR pushes up domestic prices, households increase their imports of the final good. In some instances this causes overall imports to the sector to increase in the presence of LCRs.

The economy-wide effects of the LCR must be taken into account when considering the impact of these measures. Imports are affected through three distinct channels: imports of the commodity produced by the targeted sector (e.g. electricity); imports of commodities supplied to the sector (e.g. coal to the electricity sector); and imports of sectors supplying the input commodity to the targeted sector (e.g. inputs to the production of coal). The net effect on imports is the interplay and relative price changes across all of these channels. To avoid the increase in domestic costs due to an LCR, non-targeted industries have the ability to substitute away from now more expensive domestic production to comparatively cheaper imports. This is shown to, in some cases, completely offset the original LCR.

Finally, the impact of any LCR is affected by the underlying economic conditions in the domestic economy. If the industry is currently sourcing a large part of their inputs from the domestic economy, assuming no significant supply constraints, the impact of the LCR on both the sector, and the overall economy, would be small. This is shown to be the case in many measurable LCRs which target small input shares. Those where import shares are relatively large, however, are shown to have a significant impact not just on the LCR sector, but on others who rely on the same input base.

Government procurement

Government procurement (GP) LCR measures are used to pursue multiple policy objectives. Drawbacks of these policies are that they reduce the number of firms eligible to enter markets which can lead to an increase in market power and a reduction in output and employment. These outcomes raise the cost of GP, undermining the ‘value for money’ objective. The extent to which the LCR will have an impact will depend on the market structure of the specific sector and the relative size of GP in that sector. However, the basic inefficiencies these LCRs give rise to are as much present in this sector as any other.

The scale of the distortionary effects of LCRs is influenced by a number of factors, the net outcome of which is an empirical issue. Whether the implementing country is a signatory to the WTO GPA and the nature of their commitments under that agreement; the existing level of foreign contestability in GP markets; and the role of the different levels of government in procurement could all effect the impact of a GP LCR.

Data localisation

In today's markets, data flows are an essential part of trade. These flows enhance the efficiencies of trade with specialised services firms offering a host of data storage, transfer and data mining services within and across borders, vastly reducing transaction costs. Efforts to control data generally stem from two, often overlapping, sets of policies: those requiring local storage and processing and those relating to the movement of personal data. The motivations behind these policies are numerous, but broadly fall under concerns for privacy and security. The line between legitimate privacy and security concerns and those intended to create or promote domestic industry is often blurred. Policies that require local storage also almost certainly require domestic traffic routing. This has the ability to undercut the interoperability on which the Internet depends.

Data protection and security regulations have implications on almost every sector of the economy. When overly restrictive, they affect firms' ability to adopt the most efficient technologies, influence investment and employment decisions, increase the cost of innovation and lead to missed business opportunities. The policy challenge is therefore to strike a balance between legitimate concerns about privacy and proprietary information on the one hand, and open markets on the other.

Policy alternatives

The results of the modelling show that LCRs risk reversing the trend of greater economic integration which could threaten global growth. Studies have demonstrated the benefits of intermediate trade in promoting access to technology and increased productivity. Thus in cutting off access to these inputs, LCRs actually undermine the primary objectives of industrial development and technology transfer.

Alternative policies to LCRs should seek to identify and correct the policy and other bottlenecks prohibiting the specific industrial development, technological development, or employment objectives for which the LCRs have been used. This should be undertaken as part of a collaborative effort between government, industry, and other private organisations to determine a course of action which is the most effective and least trade distorting.

Policies can be applied horizontally across the economy to provide the best possible environment for the economy to expand along areas of comparative advantage while allowing for development of new growth areas. These policies should be targeted at the business and regulatory environment, trade and investment barriers, innovation policy and infrastructure development. Improvements in these complementary policy areas will lead to trade outcomes that are more sustainable over the long run.

More targeted policies can be implemented, but governments need to address information barriers and rent-seeking behaviour before they should actively consider them. Institutions can be developed that are embedded within the market to overcome the information barrier, and strong public accountability and transparency requirements will mitigate the risk of corruption and rent-seeking behaviour. These institutions will come with a cost, and the expected benefits of any selective policies should be weighed against these costs with the objective being the least cost, most efficient policies *vis-à-vis* the trade environment.

A key aspect of these institutions will be a shift in focus from 'picking winners' to strategically working with the private sector to develop policy interventions. The interaction of the horizontal and the selective policy fronts can lead to both shorter term gains while building the underlying framework necessary for long run growth and development.

1. Introduction

The purpose of this report is to analyse and, where possible, measure the impact of localisation barriers to trade (investment is left out of the scope of this report), specifically trade-related local content requirements (LCRs). Since the onset of the recession in 2008, the implementation of new trade barriers has raised concerns among the business community and trade policy makers alike. Indeed, the G20 has called on the OECD, WTO and UNCTAD to monitor these trends in a series of semi-annual reports.[1] In the six-month period from November 2013 until May 2014 alone, G20 countries put an additional 112 new trade restrictive measures in place affecting 0.5% of world imports (WTO, OECD and UNCTAD 2014). While the majority of these measures relate to trade remedies, a sizable amount can be characterised as localisation barriers.

In order to better understand the impact of these trends, the Trade Committee has committed to undertake a more in-depth analysis of emerging trade policy issues. The term 'emerging' refers to the growing importance of an issue's potential impact on trade flows. So, while a particular measure may have been in use for many years, it is considered emerging if its implementation at this point in time is proving particularly worrisome. The widespread use of a variety of NTM measures can be seen as the most pervasive emerging trade policy issue.[2]

1.1 Identifying emerging policy issues

Recent research has raised some new motivations which may help account for the rise in NTMs. This research has shown that the influence large exporting firms can have on policy may lead to sub-optimal outcomes for liberalisation. This stems from the fact that when trade opening occurs, there are two opposing effects on domestic firms. One is that the cost of exporting decreases, leading to greater sales for exporters. The second is that domestic competition increases, leading to a reduction in sales domestically. Which outcome dominates depends on individual firm characteristics. Osgood (2012) shows that the least and most productive firms will oppose more open trade when it comes to a reduction in NTMs because the competition effect outweighs the sales effect, while firms in the middle tend to support trade opening. Gulotty (2014) reports evidence that firms engaged in global production networks can end up supporting NTMs to protect their foreign affiliates. These multinational affiliates have fewer problems overcoming fixed exporting costs but benefit from the reduced domestic competition that NTMs provide. There is even evidence that the type of NTM involved will play a role in this process (Abel-Koch, 2010).

Of the many NTM measures, this report will focus on localisation barriers to trade, specifically local content requirements (LCRs). The term localisation barriers covers a variety of specific measures (including aspects of government procurement and regulation). In general it refers to measures that favour domestic industry at the expense of foreign competitors.[3] While many of the applications of localisation barriers have been around for many years, they are reportedly being applied with increasing frequency. For example, the 2014 EU Trade and Investment Barriers Report listed many localisation issues (such as mandatory national sourcing of goods or services and special provisions to domestic firms in government procurement) as "New Significant Barriers" (EC, 2014). The business community has also noted these policies as being a primary concern.[4] Policies that are often discussed

1. The most recent report can be found http://www.oecd.org/daf/inv/investment-policy/11thG20report.pdf.
2. NTMs or non-tariff measures covers a variety of topics including licenses, competition policy, inspection and technical standards, intellectual property rules in addition to the more traditional SPS and TBT matters. See Cadot et al. (2012) for a discussion.
3. More information can be found here http://www.ustr.gov/trade-topics/localization-barriers.
4. The OECD has undertaken consultation with the business community via a series of International Business Dialogues. Localisation Barriers to Trade was raised as a primary concern at the meeting held

in the context of localisation include data storage requirements, government procurement requirements, local hiring requirements and provisions on financial flows (including repatriation of profits).[5] Examples of localisation barriers include:

- Local content requirements, i.e. requirements to purchase domestically manufactured goods or domestically supplied services;
- Subsidies or other preferences that are only received if producers use local goods, locally-owned service providers, or domestically-owned or developed intellectual property (IP), or IP that is first registered in that country;
- Requirements to provide services using local facilities or infrastructure;
- Measures to force the transfer of technology or IP;
- Unjustified requirements to comply with country- or region-specific or design-based standards; and
- Unjustified requirements to conduct or carry out duplicative conformity-assessment procedures in the country.

LCRs, especially applied in the technology sector, have lately attracted a great deal of attention. The Peterson Institute recently released a large study on the proliferation of these measures, their objectives and potential effects which included detailed case studies (Hufbauer et al., 2013). The OECD has considered domestic incentive measures in renewable energy (Bahar et al., 2013), and is also undertaking a study on the role of LCRs in in green technology.[6] The number of papers addressing concerns about localisation of data has increased almost exponentially. Sectoral studies reviewing the benefits and costs, as well as the effectiveness and important aspects for LCR policy design have been undertaken for the renewable energy (Kuntze et al., 2013), automobile sector (Veloso, 2006) and the oil and gas sector (Tordo et al., 2013 and Heum et al., 2011) to name a few. These have generally concluded that while these policies may achieve certain short run objectives, they undermine industrial competitiveness over the long run.

1.2 Defining measures to be addressed

Many industry and private publications argue that localisation barriers in general and LCRs in particular, add to the cost of doing business internationally, lead to a distortion of world trade flows and lost market opportunities. However, few studies have attempted to quantify these losses across the global trading community in any formal or systematic way. This report attempts to provide such a quantitative assessment by estimating the impact of a set of LCRs on international trade, using the new OECD Trade Model, METRO. This set is defined from information based on existing data sources and constitutes current, in-force LCR policies that have been put in place since the crisis (i.e. since 2008). While some policies are explicitly stated as 'temporary', others contain no such information. Further LCR measures once imposed, are often difficult to repeal, even when labelled as 'temporary.' Therefore, we consider all measures that are currently in force, without regard to any stated duration. The major sources are:

in March 2103 and was supported by the results of an online survey of business covering a number of geographic regions
See http://www.oecd.org/tad/tradedev/internationalbusinessdialogue2013.htm

5 Requirements in some countries intended to promote technology transfer are considered in work currently underway in TAD in relation to protection of trade secrets. See: TAD/TC/WP(2013)21.

6 See, http://www.oecd.org/investment/investment-policy/level-playing-field-for-green-energy-investment.htm and http://www.oecd-ilibrary.org/trade/domestic-incentive-measures-for-renewable-energy-with-possible-trade-implications_5k44srlksr6f-en

- The Peterson Institute for International Economics: *Local Content Requirements: A Global Problem* (The Peterson study),
- The Global Trade Alert (GTA) online database,
- European Commission Market Access Database,
- European Commission 10th Report on Potentially Trade-Restrictive Measures,
- The Information Technology & Innovation Foundation (ITIF) (2013): *Localization Barriers to Trade: Threat to the Global Innovation Economy*,
- United States Trade Representative (USTR) 2013 National Trade Estimate Report on Foreign Trade Barriers,
- World Bank Temporary Trade Barriers Database, and
- World Trade Organisation Trade Monitoring Database.

The Peterson study is the most comprehensive review of LCRs currently available.[7] The measures identified in this study form the starting point for the collection of measures reviewed in this report. The other sources listed above are searched for relevant additional measures. All of the identified LCRs are then reviewed to assess their applicability to the study.

The measures imposed, along with their economic and policy environment are analysed with the goal of providing a framework for quantitative analysis. To facilitate the development of this framework, measures are grouped two dimensionally into targeted markets (such as inputs, ownership/partnership, labour, government procurement, and data) and the identified benefits of complying with the LCR (market access, price preference, tax breaks/subsidies/price supports, government loans/funds, and domestic branding schemes).

The quantitative analysis presented in this report focusses on market access and price preference measures, which tend to be the most trade distorting. Market access measures deny non-compliant firms the ability to operate in the domestic market and thus are deemed the most restrictive. Considering the growing integration of economies via global value chains (GVCs), regional trade agreements (RTAs) and other mechanisms, LCRs on input markets might have strong distorting effects on the economy. The report focusses therefore mainly on input markets. However, given the growing concern related to LCRs in government procurement and data localisation an analysis of these two sets of measures is included but not quantified.[8]

Input measures which determine market access account for approximately 19% of all measures examined for this report. Of these, 46% were considered quantifiable. The remainder did not lend themselves to quantification. For example, some of the restrictions on inputs are not binding (i.e. domestic content already meets or exceeds the level called for in the LCR), while more detailed information on some is not readily identified, and some measures are expected to have a relatively low impact on trade (government loans and domestic branding schemes). Our qualitative analysis covers the rest of the input measures, as well as government procurement LCRs and data localisation measures. Our analysis is applied to approximately 80% of the 146 measures that were identified from

7 This study includes material sourced from the OECD, notably as outlined in Bahar et al. (2013) (available here: http://www.oecd-ilibrary.org/trade/domestic-incentive-measures-for-renewable-energy-with-possible-trade-implications_5k44srlksr6f-en).

8 The issues surrounding government procurement and data residency are large and sufficiently distinct from those with a direct industry focus that they will be separately addressed in their own studies to be undertaken in 2015/16. See Section 3.2 for more details.

the sources above.[9] The remaining measures fall outside the scope of this study (i.e. measures targeted at ownership/partnerships or labour). The full list of measures is presented in Annex A.

1.3 Characteristics of imposing economies

The 146 measures have been implemented by a variety of countries across a number of different market types (e.g. agriculture versus services). While detailed background information for each of the measures examined is included in Annex A, a summary table of characteristics is presented below. The analysis looks at LCR measures across three distinct dimensions: Table 1 reports details per country:

- Macroeconomic characteristics
- Trade policy environment
- Competitive environment

This analysis provides insights into the types of economies applying LCRs and hints at the reasons behind their implementation. In most cases, no explicit explanation is given as to the policy objective these measures hope to achieve. If a reason is given, it is typically broadly stated with an eye to public opinion. Nevertheless it is important to understand the context in which these measures are imposed if appropriate policy alternatives are to be offered.

One over-arching macroeconomic event overshadowing all of the measures examined here is the GFC. In 2009 the world economy contracted by 2.1%, the largest such change in post-war history. Between the first quarter of 2008 and the second quarter of 2009, OECD economies shrank by 4.5%. Worldwide, the volume of trade fell by roughly 12% and unemployment hit a post-war record of 8.7% in the OECD area. Meanwhile, by 2011, government spending across the OECD increased debt-to-GDP ratios to nearly 100% (Keeley and Love, 2010).

On the surface, the implementation of many LCR provisions can be attributed to the challenging economic conditions of the post-2008 world economy. However, a review of the evidence below implies that while the crisis may have triggered their implementation, the continued incidence of such policies seems to suggest more traditional industrial policy motivations.

Country characteristics

The LCRs examined in this report tend to be implemented by large economies. Since the crisis, over 58% of the measures implemented have been in economies with a GDP greater than USD 800 billion (Table 1). This could suggest that countries with economic scale believe that their domestic market is attractive enough for firms to change their method of production to develop a local industry. Population scale is also correlated with LCR implementation. The majority of LCRs (54%) have been implemented in countries with a population greater than 100 million, while 16% of the implemented LCRs are in 12 countries with less than 20 million people account.

The level of average income could be a determinant for the type of LCR that a country implements. Sixty-six per cent of the measures are implemented in countries with a GDP per capita between USD 2 500 and USD 15 000, but more than 78% of the measures that focus on industrial inputs are implemented by these countries. By contrast, two-thirds of the data localisation measures are implemented by economies with a GDP per capita of more than USD 20 000. The high percentage of input measures within the low income group could indicate that these countries are using LCRs for industrial development. The focus of developed countries on data localisation could be related to the larger role of the services sector in those countries' economies and trade profiles.

9 Though fuller analysis of the effects of government procurement and data localisation measures will be considered in separate studies.

Table 1. Summary statistics

	Local Content Requirements					Statistics										
	Inputs	GP	Data	In paper	Total	GDP (USD, b)	GDP PC (USD)	Unemployment (%), 2012	Unemployment (%), 2008	Population (m)	Simple average MFN Tariffs (%)	Simple average Preferential Tariffs (%)	Simple average Bound Tariffs (%)	Share of world exports (%)	Global competitiveness ranking	Ease of doing business
Algeria	1	1			2	204.3	5 448.4	11.0	11.3	37.5	18.6	14.2	n/a	0.00	100	153
Argentina	2	3		4	7	475.2	11 582.5	7.2	7.9	41.0	10.2	9.7	31.9	0.00	104	126
Australia	1	1	1	2	3	1 555.3	67 855.9	5.2	4.2	22.9	2.8	2.8	9.9	0.01	21	11
Azerbaijan		1			1	68.7	7 439.0	6.0	6.1	9.2	8.8	8.3	n/a	0.00	39	70
Bolivia		1			1	27.2	2 514.3	6.4	6.7	10.8	11.2	9.1	40.0	0.00	98	162
Brazil	9	6		6	17	2 247.7	11 437.4	5.5	7.9	196.5	13.7	13.8	31.4	0.01	56	116
Cambodia		1		1	1	14.1	925.5	n/a	n/a	15.3	14.2	12.4	19.1	0.00	88	137
Canada		1	2	2	3	1 821.4	52 488.7	7.3	6.2	34.7	2.5	2.7	5.4	0.02	14	19
China (People's Republic of	2	1		2	6	8 229.4	6 077.7	4.1	4.2	1 354.0	9.6	7.8	9.9	0.11	29	96
Croatia	1			1	1	56.2	13 118.9	16.1	8.3	4.3	4.7	2.3	5.7	0.00	75	89
Ecuador	2	1		2	3	87.5	5 637.7	4.9	6.9	15.5	10.1	7.4	21.7	0.00	71	135
Egypt					1	262.3	3 179.0	12.3	8.7	82.5	16.8	12.3	36.8	0.00	118	128
France			1	1	1	2 612.7	41 223.2	10.2	7.8	63.4	4.4	1.5	4.1	0.03	23	38
Ghana	1			1	1	40.4	1 622.3	n/a	n/a	24.9	13.0	13.0	92.5	0.00	114	67
Greece	1		1	2	2	248.6	22 346.6	24.2	7.7	11.1	4.4	1.5	4.1	0.00	91	72
India	2	4		4	8	1 858.7	1 514.6	n/a	n/a	1 227.2	12.4	10.1	49.4	0.02	60	134
Indonesia	5	6	1	9	18	877.8	3 590.7	6.1	8.4	244.5	6.7	5.0	37.2	0.01	38	120
Israel		1			1	257.6	33 450.9	6.9	7.7	7.7	4.0	1.6	15.3	0.00	27	35
Italy	1			1	1	2 014.4	33 915.5	10.7	6.8	59.4	4.4	1.5	4.1	0.03	49	65
Kazakhstan	2	1	1	4	6	203.5	12 034.0	5.3	6.6	16.9	7.8	6.4	n/a	0.00	50	50
Kenya					1	40.7	942.5	n/a	n/a	43.2	12.8	12.0	96.4	0.00	96	129
Malaysia	1	1		1	3	304.7	10 387.2	3.0	3.3	29.3	7.0	5.3	14.6	0.01	24	6
Mexico		1		1	1	1 183.5	10 110.7	5.0	4.0	117.1	8.9	7.3	35.0	0.02	55	53
Mongolia					1	10.3	3 634.9	8.2	9.2	2.8	5.0	4.9	17.5	0.00	107	76
Nigeria		1		1	2	264.2	1 603.6	23.9	14.9	164.8	11.7	10.9	118.3	0.01	120	147
Paraguay		1			1	24.9	3 734.5	5.8	5.7	6.7	10.4	8.3	33.4	0.00	119	109
Philippines	1			1	1	250.2	2 611.5	7.0	7.4	95.8	6.3	4.8	25.6	0.00	59	108
Russia	7	2		4	9	2 004.3	14 015.8	5.5	6.3	143.0	8.1	7.1	n/a	0.03	64	92
Saudi Arabia					1	734.0	25 139.0	5.4	5.2	29.2	4.5	4.3	10.6	0.02	20	26
South Africa	1	4		2	5	382.3	7 314.0	24.9	22.5	52.3	7.3	7.0	18.2	0.01	53	41
Switzerland	2			1	2	631.2	79 344.3	n/a	n/a	8.0	6.5	n/a	9.1	0.01	1	29
Chinese-Taipei			1	1	1	262.6	36 590.4	3.3	3.5	7.2	0.0	0.0	0.0	0.03	7	2
Tanzania	1			1	1	28.5	633.3	n/a	n/a	44.9	12.8	24.0	120.0	0.00	125	145
Turkey	2	1		2	3	788.0	10 523.4	9.2	10.9	74.9	9.6	2.4	28.6	0.01	44	69
Ukraine	1			1	2	176.2	3 877.3	7.5	6.4	45.5	4.4	9.1	5.8	0.00	84	112
United States	1	20		18	23	16 244.6	51 709.0	8.1	5.8	314.2	3.5	2.8	3.7	0.08	5	4
Uruguay					1	49.9	14 766.8	6.0	7.6	3.4	10.5	9.8	31.3	0.00	85	88
Venezuela	1			1	1	381.3	12 917.5	7.8	7.4	29.5	13.3	11.8	36.5	0.01	134	181
Viet Nam		1	1	2	3	155.6	1 752.6	4.5	4.7	88.8	9.8	7.1	11.5	0.01	70	99

Source: IMF World Economic Outlook, WITS TRAINS database, WTO Trade Profiles, WEF Global Competitiveness Report, World Bank Doing Business Database.

While such measures are ultimately harmful to trade and competitiveness, a common short-term reason for implementing LCRs is job creation. This is particularly relevant given the spike in unemployment following the crisis. Regarding the relation between unemployment rates in 2008 and the LCRs implemented since then, 67% are implemented in economies with unemployment rates over 6%[10] (Table 1). This swells to nearly 80% of the LCRs specifically targeted at industrial inputs.

It is a common perception that LCRs are imposed by traditionally closed economies, often as part of a larger industrial policy programme. However, a review of the summary statistics suggests that this may not be the case. Collectively, the countries that have implemented the 138 LCRs that form the basis for this study account for nearly 52% of global exports. The countries responsible for two-thirds of those measures account for 46% of global exports.

Trade policy environment

The current trade policy settings of the implementing economies highlights the potential relationships between the targeted markets: those focusing on industrial inputs and those relating more generally to data and government procurement.

The level of protection in an economy may be another determinant of the type of LCR that a country implements. Industrial input LCRs tend to be implemented by countries with relatively high levels of import tariffs. Sixty-one percent of the input targeted measures have been implemented by countries with a simple average MFN tariff rate greater than the 2012 global simple average MFN tariff rate of 8.1%[11] (Table 1). A similar story applies to Government Procurement measures, where 51% are implemented by those same countries. Data measures are the opposite, where 89% are implemented by countries with levels of protection beneath the global average.

A common response for countries to previous crises has been to become more insulated by increasing barriers to trade. Countries apply their tariffs at levels below their bound rates to provide themselves with space to legally increase their tariffs if regarded necessary. Comparing the simple average of the MFN and bound rates for the LCR implementing countries would suggest that, in nearly all cases, a large amount of policy space exists for these countries to increase tariffs to protect their domestic industry (Table 1).

However, this policy space has been limited by the proliferation of bilateral and plurilateral preferential trade agreements, which seek to reduce or eliminate tariffs between the parties involved. These agreements reduce a country's ability to increase tariffs to their bound rates.

Competitive environment

The comparison of the competitive environment draws on two international reviews of domestic economic settings, the World Economic Forum's *Global Competitiveness Report* (WEF, 2013), and the latest of the World Bank's *Doing Business* surveys (World Bank, 2014). The Global Competitiveness Report ranks 148 economies in terms of their competitiveness, which it defines as "the set of institutions, policies, and factors that determine the level of productivity of a country" (WEF, 2013, p. 4). The Doing Business surveys ranks economies on the ease with which local firms can operate in the regulatory environment.

According to the Global Competitiveness Report rankings, 70% of the measures are applied by the world's most competitive nations (those ranked in the top 60 out of 148). The measures implemented by the competitive economies are weighted more towards government procurement and

10. The analysis of unemployment is limited to LCR implementing countries that the IMF holds unemployment data.

11. Authors' calculation based on WITS data.

data, with more than three-quarters of those measures implemented by these economies. Nearly 70% of the input measures were implemented by economies with mid-range rankings (31-90).

The Doing Business survey rankings suggest that for objectives such as industrial development and job creation, improving the business operating environment may be a viable policy alternative to LCRs. More than 60% of all LCRs and nearly 70% of measures targeted at industrial inputs are implemented by countries that are ranked outside the top half in terms of ease of doing business. The United States is somewhat of an outlier for government procurement measures, as it is ranked the fourth easiest economy to do business in, but with ten government procurement (GP) measures, it is also the country with the most implemented measures. When excluding the United States, 71% of GP measures are implemented by the countries with the most difficult business environment. In contrast, two-thirds of the data residency measures are implemented by countries that are ranked within the top 50 in terms of ease of doing business. This difference suggests that data measures are targeted at different objectives than the industrial-input measures.

1.4 Outline of the report

The report proceeds in the following manner. Section 2 discusses the motivation for LCR policies and provides a brief review of the theoretical literature on LCRs, starting with Grossman's seminal paper from 1981. Section 3 describes the measures investigated and provides an assessment of the impact of these measures, starting with a quantitative assessment of the industry-focused measures and ending with a qualitative assessment of government procurement and data localisation. Section 4 outlines policy alternatives in light of the analysis presented and Section 5 concludes the report.

2. Local content provisions: motivation and characterisation

2.1 Policy objectives

Given that LCRs are often seen as a fiscally neutral way to promote domestic industry and employment in the face of static or falling demand, it is not surprising that they have been pursued with such vigour since the crisis. LCRs can generate immediate employment opportunities in the targeted industry and quickly reduce imports in response to balance of trade concerns, although potentially undermining these objectives in the long run. Stimulus spending as a result of the crisis was squarely aimed at bolstering sagging domestic economies and thus directed at domestic industry. The short-term impact of these measures also makes them politically attractive while over the longer run, it is hoped that the industry will become a self-sustaining source of jobs and exports, a conduit for technology or an inroad to GVCs. (Tordo et al., 2013; Kuntze et al., 2013; Hufbauer et al., 2013; Stephenson, 2013).

A relatively common characteristic of the LCRs reviewed here is the lack of an explicitly stated policy objective. The objectives indicated in the few measures which state them, combined with the insights from available studies, suggests that LCRs are used to meet a large variety of policy objectives, often at the same time. These objectives can be sorted into three broad areas: industrial development, technological development, and employment. These objectives are naturally interdependent, suggesting that pursuit of one objective can generate benefits associated with the other objectives. Inter-linkages between the policy objectives can include the additional jobs created by industrial development, while employment-focused measures might target skill development that in turn assists with technological development. Technological development is also likely to develop industry, with a flow-on improvement in jobs.

Industrial development objectives incorporate a range of policies from reasonably broad to quite specific. The broader objectives tend to focus on creating new sectors to diversify a country's industrial base. More targeted measures focus on developing upstream industries, increasing the competitiveness of existing industries with a view to developing exports, supporting the development of SMEs or minorities in the economy, or to encompass other objectives, such as improving security

of energy supply through the development of alternative energy sources. Political economy can also play a role, matching a public desire to spend Government Procurement on domestic firms, or to protect declining industry from foreign competition.

Measures targeting technological development tend to require foreign firms to transfer technology to their domestic operations or domestic suppliers. To the implementing economy, this technology transfer is seen as an efficient way of increasing competitiveness in world markets. The specific goals of technological development can include improving technological capacity and spurring innovation at the national, regional, or industrial level.

As noted, most LCRs implemented have employment as their primary objective, explicitly or implicitly stated. The use of domestic suppliers has an immediate job effect that can be particularly powerful during economic downturns while over the longer run, undermining industrial competitiveness. LCRs with employment objectives encompass types of goals like creating new jobs, creating higher skilled jobs, and increasing national income. Targeted LCRs in this group can use skill levels within the population as a specific driver as well as a measure of success for the LCR.

While most of the objectives of LCRs can fit within industrial, employment or technological objectives, there are also some that do not. These are measures related to the cross-border transfer of data, or data localisation that have been implemented to meet privacy and security objectives. LCRs are also used to support the desire to secure or maintain domestic industrial capacity in a sensitive sector.

2.2 LCRs in the literature

The literature surrounding the effects of LCRs has grown over the last 30 years. Despite this, a consensus about the merits of these policies has yet to be reached. Typically the domestic input producers gain from the LCR, but for a net increase in welfare to be realised, these gains need to outweigh the losses to domestic final good producers and consumers. These losses are larger when market power is introduced in either input or final good markets.

Relatively recent work has argued that the presence of learning-by-doing effects, technological transfer, economies of scale, and economy-wide spillovers could provide benefits that would mitigate at least some of the negative effects of LCRs. There is no clear evidence as to whether these additional benefits would actually lead to a welfare enhancement as there are no clear measures linking improved outcomes in these areas specifically to the LCR. In addition there is evidence that imported intermediate goods increase productivity in an economy (Shepherd and Stone, 2013).

Grossman (1981) provides an early and important analysis on the effects of LCRs in perfectly competitive markets. His model features a domestic downstream producer that can source inputs from a domestic or foreign upstream supplier. The domestic upstream supplier is more expensive than its foreign counterpart due to lower levels of technology in the domestic market. Under this setup, the LCR has two effects. First, the higher demand for domestic inputs increases upstream production, however, a higher upstream price flows-on to the price of the downstream good, reducing demand and production. The net effect on domestic welfare depends on the sensitivity of upstream (downstream) production to changes in downstream (upstream) prices.

2.2.1 Imperfectly competitive input and output markets

Grossman showed that LCRs can provide additional market power to domestic upstream producers, leading to a reduction in the production of domestic inputs - the opposite effect to the policy's intention. However, with a limited number of domestic producers there is an incentive to restrict production to attract a higher price. This lowers production of both domestic inputs and final products, as the higher input price flows through to output prices, leading to an unambiguous fall in demand and domestic welfare, all else equal.

The effects of an LCR are also influenced by the relationship between the inputs produced by different firms. Krishna and Itoh (1988) show that with an oligopolistic intermediate industry, an LCR will harm (benefit) domestic producers if its product is a complement (substitute) for the foreign produced good. This could be an important effect to consider when looking at the impact of an LCR along an industry's supply chain.

Grossman's work focused on the input market and the flow-on effects only to domestic final good producers. Richardson (1991) suggests that this structure is contrary to the stylised facts about the markets where LCRs are typically imposed, which generally include foreign producers of final goods. In the case of duopoly in the final goods market, an LCR reduces global production and welfare (Davidson et al., 1985). Welfare in the foreign country falls, as rents are transferred from the foreign producer to its domestic counterpart. The consumer surplus in the domestic country falls due to increased domestic prices. The net effect on national welfare is dependent on whether the rent transfer to industry outweighs the loss in consumer welfare.

The transfer of rents between foreign and domestic producers should not be taken for granted. It is possible that an LCR could increase foreign profits, at the expense of a domestic final producer. Richardson (1991) shows that, under a duopoly where the domestic final good producer can only use domestic inputs, a small LCR can have this effect. The increase in demand for domestic inputs increases their price, which flows on to the price of the domestic final product. The higher price reduces demand and the domestic producer contracts. The foreign producer is less affected by the higher domestic input prices (as it can still source most of its inputs from cheaper foreign sources), allowing it to receive a higher price and increase its profits.[12] The net effect on domestic welfare is dependent on whether the gains to the input producers outweigh the losses to the final producers.

According to Moran (1992), a potentially ideal situation for an LCR is when a foreign subsidiary is using its market power to drive down domestic input prices and lowering domestic production. In this instance an LCR could repair the distortion and increase domestic welfare.

Belderbos and Sleuwaegen (1997) add to this imperfectly competitive market literature by considering the effects of LCRs on successive market power in upstream and downstream industries. Their analysis combines the effects highlighted for inputs by Grossman (1981) and for final goods by Richardson (1991). They frame their analysis in terms of rent shifting and find that the amount of rent shifted from downstream to upstream industries dominates the rent shifted from domestic to foreign downstream firms. Thus LCRs increase inefficiency in the industry and can grant further market power, which reduces output. The higher prices also reduce consumer surplus. Greater competition in the upstream industries could mitigate some of the negative effects of the LCRs. Additionally, cooperative bargaining between upstream and downstream industries could reduce the market power related behaviour.

Including increasing returns to scale in the analysis does not, in general, justify the use of LCRs as a policy measure (Tomsik and Kubicek, 2006). The LCR still leads to a suboptimal allocation of resources that reduces efficiency, increases prices of domestic intermediates, and lowers profits of firms that use those products as inputs. However, the impact of LCRs is not as simple as the standard economic models suggest. Some have argued that there may be factors that would reduce, or could even outweigh, the negative effects of LCRs.

2.2.2 Factors that could mitigate the negative effects of LCRs

The findings of the preceding literature on LCRs are clear. LCRs cause welfare overall to reduce, with suboptimal allocation of resources worsened in the event of market power by rent-shifting from domestic downstream producers to foreign competitors and domestic upstream

12. Richardson (1991) notes that this idea is closely related to Salop and Scheffman's (1983, as cited in Richardson, 1991) strategy of 'raising rival's costs'.

producers. However, characteristics of the markets in which LCRs are typically implemented are often more complex than just market power and high domestic prices. Other factors to take into account include the roles of learning and technological spillovers, technological transfer, and resulting scale economies, thus the actual potential for LCRs should be considered on a case-by-case basis (Veloso, 2006 and 2001).

In general, the literature suggests that, when present, these factors could provide benefits that would mitigate at least some of the negative effects of LCRs. However, there is no clear evidence that those benefits will in fact outweigh the discussed negative effects. And as noted, LCRs may discourage technological transfers by reducing imported inputs and reducing investors willingness to invest.

Learning-by-doing through learned experience gained from higher production levels could lower production costs (Kuntze et al., 2013). Tomsik and Kubicek (2006) show that learning by doing effects will lower the inefficiencies associated with LCRs. However, it is not clear whether the domestic production cost would fall below the cost of the foreign input producer, which would be needed to justify the LCR.

For implementing countries, a low technological level could be seen as a barrier to the development of an internationally competitive sector. An LCR could induce, or oblige, foreign companies to use their superior technology to increase the productivity of the domestic industry. The effectiveness of an LCR to actually induce technology transfer depends on the difference in existing technology levels between the implementing and affected countries (Veloso, 2001). If the gap is too wide, then the LCR could be ineffective in helping domestic firms bridge the gap. Instead, domestic production could increase with the current technology and without productivity growth and the domestic production increase would not be sustainable. This would create a rent-seeking incentive for domestic firms to lobby policy makers to maintain the measure.

Multinationals might also react to an LCR by establishing their own vertically integrated intermediate supply in the domestic economy (Kwon and Chun, 2009). While this could deliver some technology transfer and generate some productivity improvements for the domestic sector, the level of technology diffusion to the rest of the economy would be limited, lowering the potential economy wide impacts as discussed above.

The existence of economies of scale could justify the use of an LCR to allow a domestic industry to become globally competitive (Rivers and Wigle, 2011). Veloso (2006), studying the auto industry, shows that increased production that enables scale economies significantly increase the likelihood that an LCR will increase domestic welfare. He notes that, in a market such as the auto market, it may be virtually impossible for the LCR to have a positive effect in economies without economies of scale.

LCRs could potentially increase domestic welfare when there are externalities arising from any of the market-specific factors. For example, the technology transferred from a foreign company could have applications beyond its specific market, which would boost productivity in other sectors. These externalities are not normally taken into account in the decision making of individual firms (Veloso, 2006). Thus the social benefits from increasing domestic input production induced by an LCR may be greater than the private benefit to the firm.

The potential benefits will be greatest when the differences in production costs between domestic and foreign production are small, and the gap between the social and private benefits are large (Veloso, 2006). This is the case where the sub-optimal resource allocation from the standard analysis yields small negative effects, and the potential spill over benefits to other sectors is great. Similarly, the greater the difference in production costs between domestic and foreign input suppliers, the less likely it is for an LCR to provide a net benefit to the economy.

3. Assessing the effect of local content requirements

As described in Section 1.2, this study focusses on LCRs imposed to restrict market access. These market access measures can be grouped into three broad categories: input related LCRs, government procurement, and LCRs related to data localisation. As discussed, the study attempts to quantify the effects of input-related LCRs with an empirical analysis while those related to government procurement and data localisation residency are examined in a qualitative analysis.

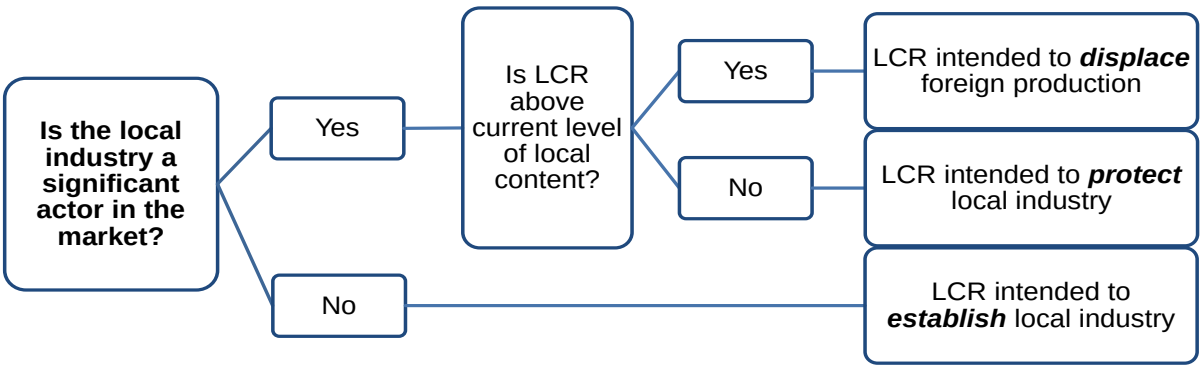
3.1 Market access measures on inputs

There are three potential ways to analyse market access measures on inputs (Figure 1). The first approach, referred to as 'displacement' measures, is applied to those situations in which local industry makes a significant contribution to the current input mix of the economy and there is already substantial foreign participation. Here, the specified share of local content in the LCR is *greater* than the existing level of local content in the industry. These LCRs aim to help the existing local industry expand by displacing foreign content. There are 12 measures in the current sample that meet this definition that are modelled as 11 separate policies, discussed in more detail below.

The second approach, referred to as "protection" measures, is applied to those situations in which local inputs make a significant contribution to the current input mix of the industry such that the specified share of local content in the LCR is *less* than the existing level of local content in the industry. The nine measures aimed at protecting local industry include five television and film LCRs, a Brazilian LCR applied to its oil and gas sector, two Indonesian measures in its telecommunications sector, and one in Indonesia's energy sector.

The third approach, referred to as "establishment" measures, is applied to those situations in which local industry is not a significant actor in the market. Here, the LCR intends to establish a local industry. The three establishment measures are related to the development of Ghana's petroleum industry, to an LCR in India's solar energy sector and a wind-turbine measure in Brazil.

Figure 1. Approaches to modelling LCR measures



Source: Author's compilation.

The remainder of this section describes the displacement measures in detail and reviews the process of determining the simulation to analyse the effects of these measures. As noted, there are 12 input measures that are modelled within 11 industry country combinations as two measures within the Russian Federation's telecommunications industry are modelled in the same scenario. Ten of the 12 measures relate to the level of local input content in production, and two relate to all purchases within an economy. The section proceeds alphabetically by implementing country. Unless otherwise stated, the data used come from the OECD Trade Model database and the reference year is 2007.

Table 2. Market access measures, by modelling approach

Inputs	Displacement	12
	Protection	9
	Establishment	5
Government procurement[a]		31
Ownership/partnership[b]		22
Data residency[a]		9
Labour[b]		4
Total		92

a) Considered qualitatively.
b) Outside scope of the paper.
Source: Annex A.

3.1.1 Argentinian reinsurance market (Argentina - INS)

In 2011, the Argentinian Superintendent of Insurance implemented a regulatory framework that prohibited cross-border reinsurance operations. Thus reinsurance can only be sold by companies located in Argentina. Reinsurance is a form of insurance sold by insurance companies to other companies in the market, intended to mitigate the risks associated with the insurance that the purchaser has sold to its own clients. As such, reinsurance works as an input into the insurance industry.

An overview of the Argentinian insurance sector shows that gross premiums in the market are valued at approximately USD 7 500 million in 2010, with reinsurance premiums contributing USD 1 152 million of the total premiums (Lloyd's, 2013). This suggests that the reinsurance market accounts for 15.4% of the total Argentinian insurance sector.

Drawing on the OECD Trade Model database, the value of intermediate inputs in the Argentinian insurance market was USD 1 155 million in 2007, of which USD 100 million were imported, implying a pre-measure level of local content of 91.3%. Assuming that all aspects of the insurance market have the same mix of inputs, the reinsurance market accounts for USD 178 million of domestic intermediate inputs and USD 15 million of imported inputs. Upon implementation, these imported reinsurance inputs would be eliminated, increasing the local content in the total insurance market to 92.6%

3.1.2 Transport services in the Argentinian mining industry (Argentina - OMN)

In 2012, the Argentinian Government issued a regulation requiring mining companies with operations in Argentina to use local transport companies for all product shipments.

The Argentinian mining sector purchases USD 18 million in transport services across air and water transport. Just over 84% of those services are purchased domestically, with USD 2.8 million purchased from foreign sources. After the measure is implemented, 100% of these transport services will be purchased domestically.

3.1.3 Motor-vehicle parts and production in Brazil (Brazil - MVH)

In 2012, Brazil issued regulations related to the industrial and trade regime for the automotive sector. The regulations, amongst other things, require at least 10 of 12 production steps for light vehicles, and 12 of 14 production steps for heavy vehicles to be completed domestically.

Combining these production processes suggests that 22 of 26 production steps are required to be completed in Brazil. Assuming a proportional value for each step the LCR would amount to 85%. The Brazilian motor vehicle industry purchases USD 52.5 billion in intermediate inputs, of which 80%

are sourced domestically. Implementing the LCR requires 85% local content, which would affect USD 2.3 billion in imported inputs.

3.1.4 Brazilian telecommunications industry (Brazil - CMN)

Brazil requires that the overall level of local content in the equipment used in 4G networks to be at least 70% from 2017. The telecommunications sector is within the post and telecommunications sector in the OECD Trade Model. It has not been possible to determine telecommunication's share of that broader sector. This means the modelling of these measures will be broader than the stated measure.

Most of the equipment that will be used in these 4G networks is likely to come from the electronic equipment and machinery and equipment sectors. Currently in the model, 62% of the inputs from these sectors into the communications sector are sourced locally. Applying a 70% LCR to these inputs would affect USD 146 million in imports.

3.1.5 Ultra-mega power projects in India (India - ELY)

Since 2010, ultra mega power projects (UMPPs) in India are no longer allowed to source equipment from abroad. Instead they must source equipment domestically. The UMPPs were first introduced in 2005 by the Indian Government. They are a series of 12 coal-fired power stations projects that are expected to generate approximately 4 000 MW each (Ministry of Power, 2007). At the time of the LCR announcement, two of the UMPPs were already online, leaving the remaining ten UMPPs requiring the use of 100% local content.

India's current electricity plan extends until the end of the 13th plan in 2022 (Ministry of Power, 2012). By that time nearly 346 000 MW of generating capacity is expected to be installed in India (Table 3). This implies that the 10 UMPPs affected by the LCR measure will contribute 11.6% of India's electricity-generating capacity in 2022. This means that 11.6% of the Indian electricity sector will have 100% local content.

Drawing on the model database, the Indian electricity industry purchases USD 54 718 million of intermediate inputs, of which 82% are locally sourced. The LCR is applied through a weighted average of local content between the existing electricity sector and the UMPPs. The 11.6% of the 2022 market is considered to be 100% local content, and the remaining 88.4% to remain at 82% local content.[13] The outcome of this approach is that with the LCR, the level of local content in the sector overall will be 84%, affecting USD 1 132 million in imports.

Table 3. Installed or planned electricity generation capacity in India (MW)

Year	Capacity in India (MW)	Source
2008	176 784	EIA (2014a), International Energy Statistics
2011	186 655	Ministry of Power (2012), Table 8.1
2017	266 345	Ministry of Power (2012), Table 9.1
2022	345 855	Ministry of Power (2012), Additional capacity for the 13th plan, page 239

13. Here there are two assumptions. First, that additional generating capacity matches the growth in electricity demand so that it has no net impact on the economy. Secondly, the input-mix between the UMPPs and the existing electricity supply will be the same. This approach is reasonable as the main objective of the modelling is to understand the impacts of the LCRs, not the impacts of additional electricity generation, or a shift in the type of electricity generation in India.

3.1.6 Cabotage in Indonesia (Indonesia - WTP)

In 2009, the Indonesia Government introduced regulations limiting the right to cabotage to Indonesian vessels, and from 1 January 2011 cabotage was restricted to only Indonesian-registered vessels. The World Bank reports that inter-island shipping accounts for 60% of the total sea-borne cargo movement in Indonesia (World Bank, 2013). The LCR implies that 60% of the purchases of water transport in Indonesia will need to be sourced locally.

Cabotage affects all purchases of water transport in the economy, so is set up as purchases by all users, including households, industry, and government. The Indonesian industry uses USD 8 073 million in water transport services. The local content of these purchases is 96%. The LCR will affect 60% of the imported content, which is USD 174 million. Sourcing these services locally as a result of the LCR increases the local content of water transport purchases to 99%.

3.1.7 Kazakhstan food imports (Kazakhstan – AGR & OFD)

In 2010 the Kazakhstan Government introduced a list of goods that were permitted to be bought from local producers. These products are bread, pasta, sweets, cereals, milk, milk products, butter, eggs, salt, and non-alcoholic beverages. These are consumer products and as such, the LCR has been aimed at final demand rather than intermediate inputs.[14]

The UN COMTRADE database shows that Kazakhstan imported USD 168 million of these products in 2008.[15] These imports represented12% of Kazakhstan's agriculture imports, and 24% of its food imports. Eliminating these imports will increase the level of local content in consumption from 98.3% to 98.5% for agriculture, and from 79.8% to 84.7% for other food products.

3.1.8 Kazakhstan subsoil sector (Kazakhstan – COG & OMN)

Kazakhstan introduced new local content requirements in the terms of subsoil use contracts. Minimum LCRs are set at 16% for goods and 85% for works and services in those industries.

The subsoil sector is spread across two sectors in the applied aggregation of the OECD Trade Model: aggregate coal, oil, and gas, and other minerals. At least 16% of intermediate inputs from each good producing sector into the subsoil sectors must be locally sourced. Similarly, the intermediate inputs from each service producing sector into the subsoil sectors must contain at least 85% local content. The model database suggests that the LCR will increase the level of local content across the two sectors from 84% to 85%, and affect USD 235 million in imports.

3.1.9 Russian telecommunications industry (the Russian Federation - CMN)

The two Russian measures in telecommunication include a local content obligation, and those firms selling telecommunications equipment are required to have scientific-equipment manufacturing located within the Russian Federation. This could imply that all of those firms' inputs of electronic equipment and machinery and equipment should come from domestic sources. The telecommunications sector constitutes a part of the larger post and telecommunications sector. It has not been possible to determine telecommunication's share of that broader sector, thus any modelling of these measures will not be as targeted as the measure.

14. This measure is included as a mandatory measure, however some ambiguity may exist about the original regulation and its actual implementation.

15. These are global imports, excluding the Russian Federation and Belarus. These two countries are excluded because, along with Kazakhstan, they are members of a Customs Union, and as such, their imports would be classed as local content.

The communications sector purchases nearly USD 596 million of electronic equipment, machinery and equipment, with 75% sourced domestically. A 100% requirement would affect USD 147 million in imports.

3.1.10 Russian automotive industry (Russian Federation - MVH)

From 2010, to qualify for duty-free import into the Russian Federation, automotive component producers must make at least 300 000 cars per year, and at least 30% of engines must be produced in the Russian Federation; the local content of components must reach at least 60% by 2020. If these conditions are met, the remaining imports can enter the market duty-free.

The model database shows that only 5% of motor vehicle parts and components inputs of the motor vehicle industry are locally sourced. This suggests that the LCR would have a strong impact in this sector by increasing the local content to 60%. With the current production and input mix this LCR would displace USD 5 979 million in imported components.

3.1.11 Venezuelan automotive industry (Venezuela - MVH)

Beginning in 2013, domestically assembled vehicles are subject to a 50% local content requirement.

The model database shows that of the inputs that the Venezuelan motor vehicle and parts industry purchased (i.e. parts and components) in 2007, 47% were locally sourced. To meet the LCR, this share would need to increase to 50%, displacing USD 116 million in imported components.

3.2 Price preference measures

In addition to the input measures which block market access, there are a number of LCRs which provide a tax break, subsidy or a price support tied to some level of local content. These measures are referred to as 'price preferences' because they provide the firm with a potential cost advantage over firms that chose not to participate. The key difference between these measures and the LCRs described above is that participation in these schemes is not a requirement for market access.[16] With a price preference measure a sector benefits from a reduction in tariffs for inputs used by that sector, if a percentage of local content of a commodity used by an activity is met. Or a sector benefits from the elimination in taxes on a domestic input used by that sector. This section describes and outlines the design for the quantitative assessment of these measures.

There are 14 LCRs that fit the description of price preferences. Three of these measures are quantified here while a further seven relate to the renewable energy sector (Box 1).[17] The remaining four measures are either implemented by countries that are not significant markets and thus not reflected in the model database, or are implemented in the same sectors and countries as modelled in the main modelling scenario and additional analysis would be redundant (see Annex A for a detailed discussion of these measures).

16. There are certain feed-in-tariff schemes that may be considered to restrict market access. They are designed in such a way that it is not possible to profitably operate in the market without participating and are discussed in Bahar et al. (2013) and Dahou et al. (2014)

17. These measures are covered comprehensively in Dahou et al. (2014). This report provides new empirical evidence that suggests that LCRs have hindered international investment and competitiveness in the solar-PV and wind-energy sectors in several countries, with mixed or negative results in achieving intended policy goals such as local job creation.

3.2.1 Brazil National Broadband Programme

In 2012, Brazil created a special tax regime for the implementation, expansion, and modernisation of its National Broadband Programme (*Programa Nacional de Banda Larga)*. Federal excise tax and social contributions will be removed when network equipment and components are sourced domestically. The same taxes will also be removed for the Brazilian companies that provide services for civil works in support of the Broadband Programme.

For the quantification, electrical equipment is defined as the relevant goods commodity, and construction services and communications services are the relevant service commodities impacted by the LCR. No specific LCR level is discussed (it was to be announced by the executive), but the tax rebate is provided on any domestic goods and services used in the National Broadband Programme. Assuming a 100% LCR would affect approximately USD 544 billion in imports (1.4% of inputs into the Brazilian communications industry).

The simulation removes the sales tax on domestic intermediates used in the communications industry. The database suggests a sales tax rate for electrical equipment of 11.5%, 2.6% for construction and 6.1% for communications.

Box 1. The case of solar PV energy in India

The OECD Investment and Environment Policy Committees have undertaken a new project on "Achieving a Level Playing Field for International Investment in Green Energy", which aims to take stock of the use of LCRs in solar photovoltaic (PV) and wind energy, and discuss their possible impacts across the solar PV and wind-energy value chains. This report (OECD, 2014 forthcoming) adds new empirical evidence to assess the impacts of LCRs across the segments of the value chains, including from relevant country case studies. In the case of India, the findings of multiple studies have called into question the effectiveness of India's LCR policy in promoting local solar PV manufacturing, in the first phase of the Jawaharlal Nehru National Solar Mission.

The Jawaharlal Nehru National Solar Mission (2009) uses a competitive bidding for new solar power tenders. Under phase I (2010-13) of the National Solar Mission, project developers had to abide by a 60% LCR for projects using cells based on PV crystalline silicon (cSi) technology, and a 30% LCR for solar thermal and concentrated solar power, to qualify for the 25-year power purchase agreement (PPA) with a fixed feed-in tariff (FiT). Solar PV modules using thin-film technology were exempted from the 60% LCR. India's National Solar Mission has set two goals: 1. deploy solar PV capacity to 200 GW by 2022 (using an auction-based feed-in tariff and public tenders); and 2. support domestic CSi manufacturing (using a LCR on CSi PV generation, which exempted thin-film technology in Phase I).

The National Solar Mission has succeeded in scaling-up PV installed capacity, from 18 MW in 2010 to 2.2 GW in 2013. Nevertheless, evidence shows that the LCR policy has had low effectiveness in scaling-up local CSi manufacturing, and has distorted India's PV market. The LCR policy has created a bias towards thin-film imports. More than 70% of India's solar PV capacity now uses imported thin-film panels, which represent only 11% of global PV capacity. Studies estimate that the LCR policy has allowed domestic CSi manufacturers to capture only 3-7% of India's solar market, much less than initially planned. India's solar CSi manufacturing base has become less competitive over time, with low capacity utilisation rate (10-15%), companies becoming bankrupt or in debt, or manufacturers surviving by diversifying. Low levels of capacity utilisation have also reduced innovation in the CSi sector, by encouraging manufacturers to use low-cost assembling. Key impediments to the growth of local CSi manufacturing included poor infrastructure, underdeveloped local supply chain, lack of raw materials and insufficient access to financing.

By requiring downstream producers to source inputs locally, the case of India also suggests that LCRs can raise the cost of inputs if domestic goods and services are more expensive than imported ones. The LCR policy has increased the cost of solar PV systems for Indian developers, of up to USD 0.08 per watt. This "balance of system" penalty results from the lower efficiency of thin-film imports created by the LCR. Compared with the global average spot price of CSi modules, this increase corresponds to a 12% rise in the cost of solar modules effectively paid by producers, i.e. up to a 3% increase on the total costs of solar systems, as a result of the LCR policy. Expanding the LCR policy to cover all solar technologies, as the Indian government has been considering, would lead to a much steeper rise of total system costs, which could increase wholesale electricity prices.

Source: OECD, 2014 forthcoming (building on evidence from: Hufbauer et al., 2013; Shrimali and Sahoo, 2014; Sahoo and Shrimali, 2013; Johnson, 2013a, b; NRDC, 2012; Ganesan et al., 2014; REN21, 2014; NRDC, 2012; Cimino, 2013).

3.2.2 Brazil special regime for the development of a fertilizer industry

In 2013, Brazil created a special regime for the development of infrastructure for the fertilizer industry. Similar to the National Broadband Programme, federal excise tax and social contributions are to be removed on sales of services, new machines and construction materials to be used in an infrastructure expansion to produce fertilizer.

The fertilizer industry forms part of the broader sector for chemicals, rubber, and plastics production. Based on revenue figures provided in Pinto (2011), the Brazilian fertilizer industry accounted for 9.50% of the Brazilian chemicals industry in 2009. The World Input Output Database (WIOD) shows that, at basic prices, the Brazilian chemicals industry accounts for approximately for 77% of the combined chemicals, rubber, and plastics sector in 2009. This suggests that the Brazilian fertilizer industry accounts for 7.3% of the Brazilian chemicals, rubber, and plastics sector.

Other machinery, electrical equipment and construction are assumed to be the relevant input commodities and services targeted with the LCR. No specific LCR level is discussed (again it was to be announced by the executive), but the tax rebate is provided on any domestic goods and services used in programme. Assuming a 100% LCR would affect approximately USD 74.5 billion in imports. The simulation removes the sales tax on domestic intermediates giving them a price advantage over foreign inputs. The database suggests that the intermediate tax rates for other machinery and equipment is 8.2%, electrical equipment is 11.5%, and construction is 2.6%.

3.2.3 Indonesia motor vehicle assembly and components industry

In 2012, Indonesia's Ministry of Finance announced the tariff elimination on machinery, goods, and materials used in the motor vehicle assembly and components industry for companies that purchase at least 30% of the total value of machines locally.

In its current version, it is not possible to remove tariffs for specific activities with the OECD Trade Model and link these to an LCR, i.e. to remove the tariffs on commodities that are used only by the motor vehicle and components industry. Instead, the same method is followed as for the two Brazilian measures, removing the sales tax on domestic intermediates used by the motor vehicles industry. As the tariff reduction is directly related to the use of local content it is thus interpreted as direct price preference on the use of domestic inputs, as proxied by a sales tax reduction.

3.3 Quantitative assessment

The few studies that have attempted to measure the effects of LCRs have relied on analysing their impact through prices. The LCRs are usually converted to *ad valorem* equivalents or treated as shadow prices. Jensen and Tarr (2008), in a recent attempt to measure LCR impacts, examined the oil and gas sector in Kazakhstan. They modelled the Kazakh local content policies as a 20% price preference (subsidy) to multinationals for domestic inputs, which is financed out of the gross revenues of multinational oil firms. They find that the elimination of these local content policies results in a gain in welfare equal to 0.2%of consumption.[18]

The use of *ad valorem* tariff equivalents in the context of LCRs suffers from two major problems: first, there are no estimates of the size of a possible ad valorem equivalent. Accordingly, Hufbauer et al., (2013) simply apply an ad valorem equivalent of 10%. Second, as noted throughout this study, most LCRs use quantities rather than prices to influence the geographic distribution of purchases. Hence, LCRs are not price instruments, rather they affect the quantity which then influences prices. This implies different market adjustment processes.[19] To estimate the effects of

18. In this report implementation of Kazakhstan's LCRs in the subsoil sector, which includes the oil and gas sector, increases household consumption by 0.3%.

19. A 'tariff equivalent' analysis of the LCR measures examined in this report was undertaken and there were significant differences in outcomes. When assuming tariff equivalents, domestic production

these policies an alternative approach to including LCRs in a CGE framework is developed based on quantity effects. The details of this approach are outlined in Annex B.

As noted, the purpose of this report is to measures the effects of LCRs put in place since the GFC on international trade and the broader effects throughout the implementing economy. To accomplish this, the OECD Trade Model, a multi-regional Computable General Equilibrium (CGE) model, is employed. The CGE framework provides a unique opportunity to capture inter-industry affects while tracking differences in trade patterns by individual country and sector. However, it does require a level of aggregation greater than most of the LCRs reviewed. The LCRs that are investigated tend to be targeted at highly specified segments of the economy however this level of detail cannot be maintained in the analysis of economy wide and worldwide effects. Other, non-CGE, methodologies may be able to provide a deeper analysis of the impact on specific market segments, but they are unlikely to provide such a rich understanding of the effects outside the particular sector. In addition, partial equilibrium approaches, by their design, are limited in their ability to capture the economy-wide and indeed world-wide effects of the LCRs.

The database developed for the OECD Trade Model differentiates imports (and by default exports) by four use categories: (1) intermediate use, (2) private consumption, (3) government consumption and (4) investment consumption. Accordingly, the commodity account is split to identify imported and domestic goods.[20] This is an important distinction because it is on the imported intermediate use that the majority of LCR restrictions apply, the exceptions being Kazakhstan's food policy and Indonesian cabotage policy. Table 4 provides a summary of the measures examined.[21] Imports are assumed to be imperfectly substitutable with domestic goods and production for export markets is imperfectly substitutable with that for domestic markets. The producing activity uses intermediate goods and domestic value added, which are imperfectly substitutable, with intermediate inputs used in fixed shares.[22]

3.3.1 Impacts of displacement local content measures

As described above, the measures classified as "displacement" are intended to replace imports currently being used in production with domestically-sourced input. Therefore, the quantification of impacts involves restricting existing markets so that imports are limited to that, or below, the share stipulated in the legislation. The impact of these measures will be directly related to the size of the import market share affect. Those sectors already sourcing a majority of their inputs domestically see little effects on trade while those with sizable import shares experience larger adjustments. These adjustments have greater impact throughout the economy.

The implementation of the 11 displacement LCRs has the potential to disrupt almost USD 10.45 billion in imports (Table 4). The level of displaced imports of each measure ranges from USD 3 million in the Argentinian water transport market through to USD 6 billion in the Russian automotive industry. Figure 2 shows the impacts of the LCR in terms of local content in each industry, before and after the measure is implemented. The percentage change in local content following LCR implementation ranges from 1.3% in the Argentinian insurance market, to 55.0% in the Russian automotive industry. All else being equal, smaller effects are expected in those industries for which the LCR leads to only a small adjustment in domestic content.

actually goes down with no corresponding increase in domestic input demand. This is inconsistent with what is observed in the market and the outcomes achieved using the quantitative approach to modelling applied here. Details of this analysis are available from the authors upon request.

20. The underlying database is taken from the GTAP database (see Badri and Walmsley, 2012).

21. The full dataset consists of all 57 GTAP sectors and 56 regions (see Annex B for details). For purposes of this study the database is aggregated to 20 sectors and 12 regions plus the rest of the world (row).

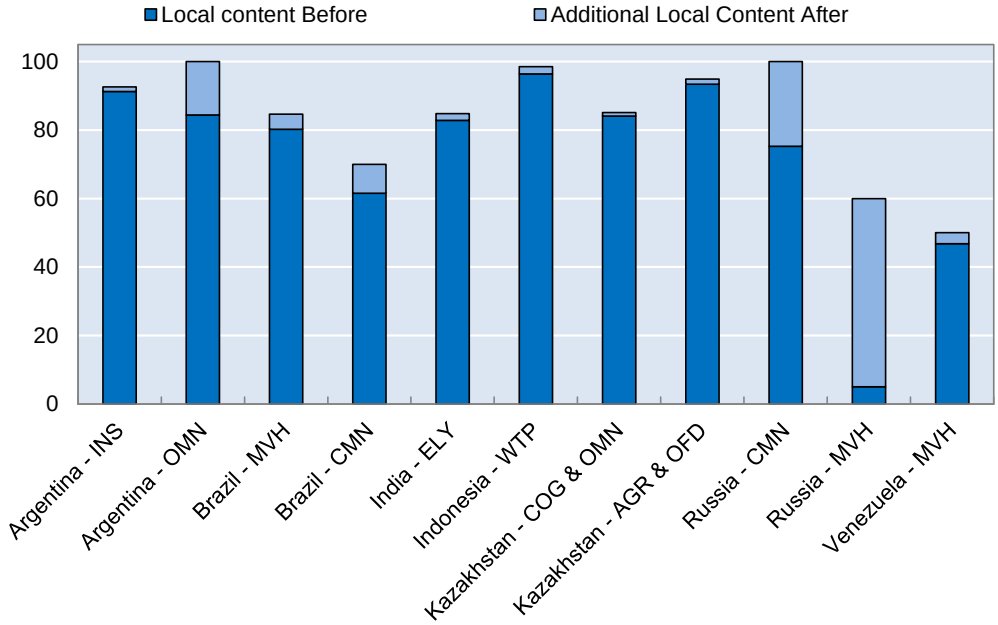
22. Details of the model structure are contained in Annex B.

Table 4. Summary of industry-focused displacement measures

Country	Measure	Sector	Commodity	Affected inputs	Mandated domestic share	Expected level of displaced imports (USD, m)
Argentina	Argentina - INS	insurance	all sectors	Domestic share of inputs into insurance sector	0.918	15.5
	Argentina - OMN	other mineral products	other transport	Domestic share of otp inputs into mining sector	1.000	2.8
		other mineral products	water transport	Domestic share of wtp inputs into mining sector	1.000	
Brazil	Brazil - MVH	motor vehicles and parts	all sectors	Domestic share of inputs into motor vehicle sector	0.846	2 306.9
	Brazil - CMN	post and communications	electrical equipment	Domestic share of inputs into communications sector	0.700	146.4
			machinery and equipment	Domestic share of inputs into communications sector	0.700	
India	India - ELY	electrcity	all sectors	Domestic share of inputs into electricity sector	0.842	1 156.8
Indonesia	Indonesia - WTP	all sectors	water transport	Domestic share of purchases of water transport by all sectors	0.984	174.0
Kazahkstan	Kazahkstan - AGR & OFD	all sectors	agriculture	Domestic share of purchases of agriculture by all sectors	0.985	168.0
			other food products	Domestic share of purchases of food by all sectors	0.847	
	Kazakhstan - COG & OMN	coal, oil and gas	all goods	Domestic share of coal, oil and gas's purchases from goods inputs	0.160	234.6
			all services	Domestic share of coal, oil and gas's purchases from services inputs	0.850	
		other mineral products	all goods	Domestic share of coal, oil and gas's purchases from goods inputs	0.160	
			all services	Domestic share of coal, oil and gas's purchases from services inputs	0.850	
Russia	Russia - CMN	post and communications	electrical equipment	Domestic share of inputs into comunications sector	1.000	147.3
			machinery and equipment	Domestic share of inputs into comunications sector	1.000	
	Russia - MVH	motor vehicles and parts	motor vehicles and parts	Domestic share of motor vehicles's purchases from motor vehicles	0.600	5 979.5
Venezuela	Venezula - MVH	motor vehicles and parts	motor vehicles and parts	Domestic share of motor vehicles's purchases from motor vehicles	0.500	115.7
Total						10 447.5

Source: Author's calculations based on OECD Trade Model Database.

Figure 2. Change in local content following LCR implementation



Source: Author's calculations based on OECD Trade Model Database.

While each measure has a specific process, imposing an LCR raises domestic production costs for the targeted industry, assuming that prior to the LCR each producer was free to choose from the most cost-effective source (whether it be domestic or foreign).[23] Thus, an LCR is a government mandated decision to choose a less efficient supplier. The increase in production costs leads to an increase in prices. The increased prices in turn raise costs to producers further along the production chain, reducing the competitiveness of industries across the economy along the lines identified in Grossman's (1981) seminal work. This is especially true when LCRs are placed on input industries used broadly throughout the economy, such as electricity or communications. In the case of a non-binding LCR it can be inferred, assuming open markets, that the domestic supplier is the most efficient. When a measure is binding, as is the case for the 11 displacement measures shown in Figure 2, efficiency losses in the market place are relative to the additional domestic inputs required. As noted in the literature review, the differential in domestic and foreign costs is a key determinant of the impact of the LCR.

When determining the total economic impact of these local content measures, it is important to account for their indirect effects throughout the economy. For example, imports are affected through three distinct channels: imports of the commodity produced by the targeted sector (e.g. electricity); imports of input commodities to the targeted sector (e.g. coal to the electricity sector); and imports of commodities to the input sector of the targeted sector (e.g. inputs to the production of coal). The net effect on imports is the interplay and relative price changes across all of these channels. To avoid the increase in domestic costs due to an LCR, non-targeted industries have the ability to substitute away from now more expensive domestic production to comparatively cheaper imports. This can often completely offset the original LCR. Further, the net trade effect is determined by the degree to which all import changes affect the country's exchange rate and subsequently affect exports. For example,

23. In this discussion, the targeted industry is the industry that is required to meet the LCR.

while there can be export gains associated with an LCR[24], the exchange-rate effect often undercuts these, resulting in a decrease in overall exports.[25] As noted below, both exports and imports decline in all of the implementing economies examined here.

With these overall trends in mind, the outcomes of the model are presented next.

Impact of displacement measures

The economic impacts of the LCR displacement measures are presented in Tables 5, 6 and 7.[26] The tables report the impact on each region, highlighting those sectors and economies in which LCRs have been implemented. First and foremost the tables show that total imports and total exports decline in every region as a result of these policies, even in those regions not implementing an LCR (top panel of Table 5). These percent change declines translate into a fall in total imports of USD12 billion and exports of nearly USD 11 billion. It is important to keep in mind that this is a net effect, after accounting for the adjustment process outlined above. That is, after accounting for the response of households and other sectors which generally increase their import shares in response to domestic price increases. The general appreciation in exchange rates undercuts attempts to establish terms of trade benefits, with imports declining more than exports in only five of the 12 regions. Global welfare goes down as well, as households experience a decline of over USD 5 billion or an average of 0.07% of household income across the globe.[27]

The limited impact these measures have on macroeconomic outcomes is not surprising given both the very specific sectors targeted as well as the small amount of domestic activity actually affected by the LCRs (Figure 2). However, this small impact is also true for their effect on unemployment, a primary objective in most cases. And the impact on employment is limited to the targeted sectors. In most other sectors, employment demand declines. (Annex Tables C1, C5-C7).

The results indicate that a country's sectoral composition is a greater determinant of the effects of the LCRs than its economic size. For example, Venezuela, a relatively small economy, experiences a larger trade effect than the United States, but smaller than Indonesia (Table 7). This suggests that Venezuela's economic structure was such that it was more heavily affected by the LCRs in its relatively large sectors (such as coal, oil and gas) than the United States, but less so than Indonesia (motor vehicles, and coal, oil and gas). In addition, the significant negative impact these industry targeted measures have on intermediate (as opposed to household) trade is evident. The declines in total imports and exports shown in Table 6 are a result of the sectoral declines in intermediate trade shown in Table 7.

24 As input suppliers are able to raise prices to the targeted industry, they can simultaneously lower prices on global markets without risking profits. This then can lead to an expansion of exports in the supplier industries.

25 The sensitivity of results to macroeconomic assumptions, including exchange rate behaviour, is investigated in Annex D.

26 The results presented here assume that each region is experiencing unemployment. Annex D outlines the model assumptions regarding the underlying economic conditions plus the sensitivity analysis undertaken.

27 Welfare is measured by equivalent variation which quantifies the change in income needed by households to maintain the same level of utility they were experiencing before the policy change.

Table 5. Macro impact of binding local content requirements

Summary of outcomes, percentage change

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
Imports:													
Intermediates	-0.57	-1.15	-0.13	-0.57	-1.50	-0.04	-0.17	0.14	-0.04	-0.07	-0.03	-0.06	-0.02
Households	-0.31	1.07	-0.15	0.39	0.71	-0.04	0.02	-2.42	-0.03	-0.07	-0.02	-0.05	-0.03
Exports:													
Intermediates	-0.66	-0.37	-0.11	-0.66	-0.10	-0.05	-0.06	-0.54	-0.04	-0.10	-0.03	-0.08	-0.03
Households	0.25	-0.92	-0.15	-0.67	-1.13	0.01	-0.07	-0.21	0.00	0.06	-0.02	0.01	0.00
PPI	0.02	0.02	0.00	0.08	-0.04	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	-0.02	0.00	0.02	-0.01	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.08	-0.57	-0.09	-0.29	-0.50	-0.02	-0.07	-0.49	-0.02	0.00	-0.03	-0.02	-0.02

Source: Authors' calculations.

Table 6. Impact of binding local content requirements [a,b]

Summary of outcomes, percentage change

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
Coal, oil and gas													
Production	0.08	-0.27	-0.04	3.45	-0.21	0.01	-0.03	-0.36	0.00	0.01	0.02	0.04	0.00
Production cost	0.14	-0.36	-0.05	2.75	-0.37	0.01	-0.04	-0.37	0.01	0.02	0.03	0.04	0.01
Exports	-0.03	-0.83	-0.07	-0.03	-0.52	0.10	-0.05	-0.49	0.03	0.00	0.01	0.04	-0.02
Imports	0.06	1.05	-0.03	5.04	0.38	0.00	0.05	-8.25	0.00	0.00	0.03	0.03	0.01
Labour demand	0.12	-0.37	-0.05	4.10	-0.30	0.01	-0.04	-0.47	0.00	0.02	0.03	0.05	0.00
Communications													
Production	0.02	0.15	0.01	-0.17	0.03	-0.01	0.03	0.79	-0.02	-0.02	-0.01	-0.02	0.00
Production cost	-0.02	0.03	0.00	-0.04	-0.05	0.00	0.01	0.15	0.00	0.00	0.00	0.00	0.00
Exports	0.17	-0.63	-0.08	-0.42	-0.53	0.00	-0.06	-0.29	0.00	0.02	-0.01	0.01	0.00
Imports	-0.02	-4.28	-0.29	0.32	-8.52	-0.04	0.07	1.71	-0.01	-0.05	-0.01	-0.03	0.00
Labour demand	-0.01	0.18	0.01	-0.22	-0.04	-0.02	0.04	0.98	-0.02	-0.02	-0.02	-0.02	0.00
Electricity													
Production	-0.01	0.07	0.01	-0.26	0.18	-0.01	0.03	0.48	-0.02	-0.01	-0.01	-0.01	0.01
Production cost	0.03	0.03	-0.01	0.33	-0.11	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00
Exports	0.14	-0.97	-0.05	-0.29	-0.54	0.10	0.57	-0.57	0.06	0.07	0.02	0.05	0.11
Imports	-0.17	1.18	0.07	-48.88	0.83	-0.04	0.13	1.21	-0.02	-0.05	-0.03	-0.04	-0.03
Labour demand	0.03	0.10	0.00	0.16	0.04	-0.02	0.04	0.51	-0.01	-0.01	-0.01	-0.01	0.01
Food products													
Production	0.11	-0.11	0.06	-0.12	-0.27	-0.01	0.02	4.26	-0.02	-0.01	-0.01	-0.01	0.01
Production cost	0.04	0.00	0.01	-0.01	-0.08	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Exports	0.27	-0.98	-0.01	-0.52	-2.41	0.01	-0.08	1.79	-0.01	0.03	0.00	0.00	0.00
Imports	-0.10	1.05	-0.61	0.58	0.33	-0.07	0.04	5.66	-0.09	-0.08	-0.03	-0.06	-0.04
Labour demand	0.15	-0.11	0.07	-0.14	-0.36	-0.01	0.04	4.26	-0.02	-0.01	-0.01	-0.01	0.01
Insurance													
Production	0.41	0.11	0.05	-0.18	-0.07	-0.02	0.03	0.84	-0.02	-0.01	-0.02	-0.02	0.00
Production cost	-0.01	0.03	0.00	-0.03	-0.02	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00
Exports	0.05	-0.67	-0.03	-0.44	-0.62	-0.01	-0.03	-0.04	-0.01	0.02	-0.03	0.00	0.00
Imports	-34.77	0.79	0.07	0.42	0.70	-0.03	0.07	1.51	-0.03	-0.05	-0.02	-0.04	-0.01
Labour demand	0.40	0.15	0.05	-0.21	-0.10	-0.02	0.03	1.05	-0.02	-0.02	-0.02	-0.02	0.00
Motor vehicles													
Production	-3.76	3.89	-0.30	-0.16	19.22	-0.09	1.32	20.11	-0.07	-0.43	-0.34	-0.29	-0.31
Production cost	-0.19	-0.06	-0.01	-0.07	2.39	0.02	-0.12	-6.97	0.03	0.05	0.01	0.03	-0.11
Exports	-6.47	2.18	-1.02	-1.00	29.88	-0.41	0.09	15.98	-0.56	-0.67	-0.76	-0.44	-1.00
Imports	-3.43	-29.09	-1.38	0.82	-26.13	-0.10	-2.44	22.55	-0.11	-0.37	-0.33	-0.28	-0.01
Labour demand	-4.00	3.81	-0.31	-0.25	22.81	-0.07	1.16	9.65	-0.04	-0.38	-0.32	-0.25	-0.45
Other minerals													
Production	0.11	-0.23	0.01	-0.97	0.31	0.00	0.04	0.03	0.04	0.05	0.04	0.02	0.05
Production cost	0.05	-0.12	-0.02	0.76	-0.16	0.00	-0.01	-0.13	0.01	0.00	0.00	0.01	0.00
Exports	0.12	-0.34	0.02	-1.14	0.06	0.03	0.05	0.10	0.04	0.09	0.06	0.03	0.07
Imports	-0.87	1.07	-0.04	-0.09	1.05	0.00	0.13	-2.27	0.00	0.01	0.04	0.00	0.05
Labour demand	0.12	-0.26	0.01	-0.82	0.28	0.01	0.03	0.01	0.04	0.05	0.04	0.02	0.04
Water transport sector													
Production	0.04	0.07	2.55	0.71	-0.19	-0.03	-0.07	0.56	-0.03	-0.06	-0.13	-0.16	-0.14
Production cost	-0.01	-0.01	-0.01	-0.03	-0.04	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.01
Exports	0.07	-0.60	1.85	0.17	-0.66	-0.08	-0.15	-0.27	-0.06	-0.07	-0.14	-0.17	-0.20
Imports	-0.03	1.17	2.67	1.54	0.71	-0.06	0.07	-0.11	-0.04	-0.10	-0.13	-0.18	-0.16
Labour demand	0.03	0.06	2.54	0.66	-0.26	-0.03	-0.05	0.67	-0.03	-0.05	-0.12	-0.16	-0.13

a) For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

b) The exchange rate is in price notation, thus a decrease indicates an appreciation in respect to the reference region (Rest of G20).

Source: Authors' compilation.

Table 7. Trade impact of binding local content requirements

Percentage change

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
						Coal, oil and gas							
Imports													
Intermediates	0.23	0.72	0.07	-1.55	0.32	-0.01	0.01	0.60	-0.06	-0.02	-0.07	-0.01	-0.03
Households	-0.28	0.99	0.13	11.55	0.33	-0.21	-0.03	2.13	-0.43	-0.05	-0.12	-0.07	-0.17
Exports													
Intermediates	-0.03	-0.83	-0.07	-0.03	-0.52	0.10	-0.05	-0.49	0.03	0.00	0.02	0.05	-0.02
Households	-0.07	-0.17	0.04	-0.07	-0.35	-0.07	-0.08	-0.68	-0.07	0.12	-0.08	-0.03	0.04
						Communications							
Imports													
Intermediates	-0.41	0.84	0.11	0.18	0.63	-0.05	0.10	1.35	-0.02	-0.05	-0.02	-0.04	-0.01
Households	-0.17	0.82	0.09	0.28	0.54	-0.04	0.08	1.26	-0.03	-0.05	-0.01	-0.03	-0.01
Exports													
Intermediates	0.18	-0.62	-0.07	-0.45	-0.49	0.00	-0.05	-0.22	0.00	0.02	-0.01	0.01	0.00
Households	0.14	-0.64	-0.09	-0.35	-0.58	0.00	-0.08	-0.35	0.00	0.02	-0.01	0.00	0.00
						Electricity							
Imports													
Intermediates	-0.19	1.04	0.10	0.95	0.90	-0.13	-0.02	1.11	-0.14	-0.18	-0.02	-0.11	-0.07
Households	-0.21	1.10	0.08	0.80	0.69	-0.09	0.03	1.39	-0.14	-0.30	-0.03	-0.17	-0.08
Exports													
Intermediates	0.15	-0.97	-0.06	-0.35	-0.46	0.10	0.59	-0.47	0.05	0.09	0.02	0.05	0.14
Households	0.09	-0.93	-0.04	-0.05	-0.67	0.10	0.53	-0.65	0.07	0.05	0.02	0.05	0.07
						Insurance							
Imports													
Intermediates	-3.26	0.85	0.16	0.20	0.65	-0.02	0.09	-0.35	-0.02	-0.05	-0.01	-0.03	0.00
Households	-0.51	0.82	0.09	0.27	0.55	-0.02	0.07	1.23	-0.03	-0.05	-0.01	-0.04	-0.01
Exports													
Intermediates	0.00	-0.68	-0.02	-0.45	-0.59	-0.01	-0.01	-0.01	-0.01	0.02	-0.03	0.00	0.00
Households	0.09	-0.67	-0.05	-0.38	-0.64	-0.01	-0.04	-0.03	-0.01	0.02	-0.02	0.00	0.00
						Motor vehicle production							
Imports													
Intermediates	-2.28	-19.16	0.10	0.17	-14.02	-0.06	-2.14	3.49	-0.11	-0.20	-0.08	-0.20	0.25
Households	-0.50	1.22	0.10	0.35	3.43	-0.15	-0.09	-0.13	-0.05	-0.10	-0.04	-0.06	-0.15
Exports													
Intermediates	-17.02	5.01	-1.27	-1.23	101.43	-0.70	-0.27	-8.36	-0.96	-1.02	-1.02	-0.73	-2.34
Households	0.73	-0.69	-0.17	-0.36	-5.07	0.02	0.28	20.51	0.13	0.35	0.04	-0.03	0.34
						Food products							
Imports													
Intermediates	-0.47	1.18	0.23	0.25	0.43	-0.09	0.01	-13.33	-0.03	-0.10	-0.01	-0.05	-0.06
Households	-0.48	1.20	0.11	0.38	0.68	-0.04	-0.01	-15.96	-0.08	-0.08	-0.03	-0.04	-0.06
Exports													
Intermediates	0.29	-1.01	0.08	-0.61	-2.34	0.03	-0.08	2.54	0.01	0.05	0.00	0.02	0.04
Households	0.26	-0.95	-0.12	-0.47	-2.11	0.01	-0.08	1.39	-0.01	0.03	0.00	0.00	-0.02
						Other minerals production							
Imports													
Intermediates	-0.15	0.36	-0.03	0.01	0.46	-0.03	0.00	0.20	-0.10	-0.03	-0.01	-0.02	-0.03
Households	-0.11	0.48	0.01	0.21	0.46	-0.03	0.03	0.77	0.09	-0.04	-0.03	0.00	0.01
Exports													
Intermediates	0.12	-0.34	0.02	-1.14	0.06	0.03	0.05	0.10	0.04	0.09	0.06	0.03	0.07
Households	0.01	-0.03	-0.01	-1.31	0.34	0.03	0.03	0.32	0.09	0.00	0.04	0.06	0.00
						Water transport							
Imports													
Intermediates	-0.36	-0.96	-53.89	-4.49	0.73	-0.04	0.09	1.08	-0.04	-0.07	-0.09	-0.08	-0.03
Households	-0.12	0.76	-70.13	0.23	0.55	-0.01	0.04	1.21	-0.02	-0.07	-0.04	-0.06	-0.02
Exports													
Intermediates	-0.09	-0.57	1.14	0.18	-0.62	-0.07	-0.16	-0.26	-0.06	-0.07	-0.13	-0.16	-0.19
Households	0.44	-0.76	3.67	-0.40	-0.87	-0.19	-0.05	-0.15	-0.23	-0.22	-0.39	-0.25	-0.27

Source: Authors' compilation.

This disproportionate impact on intermediates trade, which is where these LCRs are typically targeted, is highlighted in Table 8. Imports of intermediate goods account for almost all of the total import declines (USD 10 billion), and 80% of the drop in exports (USD 8.6 billion).[28] The negative outcome for trade in intermediates is particularly alarming when considered in the context of global value chains (GVCs). The fragmentation of production in GVCs has increased the importance of trade in intermediates. In most countries, approximately one-third of intermediate imports are included in exports (OECD, 2013d). Trade in intermediates has also been shown to be correlated with higher productivity levels, with the view that foreign imports embody higher levels of technology (Shepherd and Stone, 2013). The results presented here imply that LCRs can lead to increasing economic isolation, undercutting important gains made from the rise of GVC activity. Reducing trade in intermediates in particular threatens to lower productivity and reduce connectivity across the globe.

Table 8. Changes in trade, by use

US dollars billion

	Imports		Exports	
	Intermediates	**Households**	**Intermediates**	**Households**
Argentina	-0.17	-0.02	-0.30	0.03
Brazil	-1.40	0.22	-0.47	-0.28
India	-1.49	0.09	-1.07	-0.32
Indonesia	-0.09	-0.04	-0.11	-0.04
Russia	-2.16	0.61	-0.28	-0.26
United States	-0.56	-0.22	-0.48	0.03
Venezuela	-0.04	0.00	-0.03	0.00
Kazakhstan	0.04	-0.21	-0.23	-0.01
China (People's Republic of)	-0.32	-0.02	-0.24	0.02
Rest of G20	-1.16	-0.32	-1.80	0.18
Rest of OECD	-0.09	-0.02	-0.11	-0.03
European Union	-2.29	-0.59	-2.87	0.08
Rest of World	-0.29	-0.15	-0.61	0.00
Total	-10.03	-0.68	-8.61	-0.59

Source: Author's calculations.

The individual sector results are detailed below but a familiar story emerges. While LCRs increase production and employment in the affected sector, there is substitution away from these now more expensive goods in the rest of the economy. The structure of the OECD Trade Model allows different substitution possibilities among different domestic users. Thus it can be observed that while the LCR forces firms to buy intermediate inputs from domestic sources, households are under no such limitation. As the LCR pushes up domestic production costs, households increase their imports of the final good. This is why for some sector/region groupings, imports within an industry can increase in the presence of LCRs (Table 7).

Consistent with the general trend of these policies as discussed above, most affected sectors experience an increase in their production costs. When there are cost declines, they are a result of increased imports into many of the non-targeted input sectors. Exports almost universally decline due to a decrease in the sectors competitiveness. This appears even in those sectors experiencing declining production costs. This is because the exchange rate appreciation

28. The large effects on the European Union and the Russian Federationare related to the Russian Federation's motor vehicle LCR. Of the USD 2.87 billion fall in European intermediate exports, USD 2.79 billion were related to motor vehicle intermediates. Of the USSD 2.29 billion fall in European imports, USD 1.52 billion were in other manufacturing and motor vehicle intermediates.

causes the cost of these exports to rise on world markets. However, exports of some of the major inputs do increase. For example, the electrical equipment sector in Brazil is able to increase its production to meet the increased demand for its inputs to the communications sector, but it is also able to increase exports, especially to household markets (while more intermediate inputs are sold domestically). The ability to expand into export markets helps drive the employment gains where they are observed. Thus, while cutting off access to international markets on the one hand, it is the ability to operate in these markets that helps mitigate the detrimental effects of the LCRs

The remainder of the section provides a discussion of the impacts of the industry-focused LCRs on each of the targeted sectors. Tables presenting the impact of each individual LCR are contained in Annex C. References are made to the general results as well as to these annex tables in the discussion below.

Coal, oil and gas

The coal, oil and gas (cog) sector is a major sector in the economy of Kazakhstan, accounting for almost 15% of total output. The LCR mandates an increase in the purchase of domestic inputs to the cog sector and thus total imported inputs to the cog sector decline by -7.6%, (Annex Table C7). The sector experiences a decline of -8.3% (Table 6) from the imposition of all LCRs (Table 6). As predicted in the discussion above, total output of cog in Kazakhstan declines by -0.1% from LCRs imposed in this sector, and by -0.36% from all LCRs (Table 6). The contraction in output causes demand for labour in the cog sector to decline -0.47%, with -0.14% due specifically to the cog LCR (Annex Table C7). The discussion below is based on the outcomes of the LCR on cog only taken from information contained in Annex Table C7.

The relative change in demand for imports leads to an appreciation in the exchange rate which and causes an expansion in household demand for imported cog by 0.8%.[29] The reduction in cog output, together with an appreciated exchange rate, reduces total exports of the sector (-0.2%). Exports to households experience a larger decline (-0.16%) than intermediate exports (-0.12%) due to their smaller base. The changing exchange rate in turn causes the input activities of the cog sector to import a greater share of their own intermediate inputs. In addition, the cog industry begins to import more of other factors, not subject to the LCR. This leads to an overall decline in the production costs of the cog sector (-0.16%). Nevertheless, output still falls, pulled down by the decline in the household demand cog.

The LCR causes the largest adjustments in the inputs to the cog sector (e.g. the transport sector and business services). Part of the increased demand mandated by the LCR is met by an increase in domestic output (from 1.57% for business services to 0.10% for transport), and the rest from a decline in exports (-0.01% in business services and -0.12% in transport). The expanding production in these input sectors means labour demand increases, especially in business services (1.5%). As the model assumes a level of unemployment, this increase in labour demand does not affect the wage rate.

The major exporters of inputs to Kazakhstan's cog sector (the G20 region and other EU member states) are not overly affected by the LCRs given the fact that Kazakhstan is a relatively small market. Average intermediate exports of business services fall -0.02%. However importers of Kazakhstan's cog are affected, with the United States, EU member states (imports falling in both markets by -0.18%), Brazil and the rest of the world (both -0.17%) experiencing the largest declines in imports from Kazakhstan. This is replaced by imports from the rest of the world thus there is no change in total cog imports in these economies (Annex Table C7).

29. Outcomes under a fixed exchange rate do not materially affect the results. See Annex E for details.

Communications

The effects of the communications LCRs, implemented by Brazil and Russian Federation (Table 6), can be obscured in the general results because both countries have implemented significant LCRs in their motor vehicle industry which dominate these total results. Both countries increase communications output in the general results (0.15% for Brazil and 0.03% for the Russian Federation) but only a small part of those increases are related to the communications LCRs (only 0.01% for Brazil and 0.004% for the Russian Federation). As such, the effects of the communications LCRs are considered in isolation (Annex Tables C3 and C8).

The LCR increases demand for domestic production, and reduces demand for imported inputs, of electrical and machinery and equipment into the communications industry. Imports of these inputs fall dramatically, albeit from a low base. Imports of machinery and equipment into the communications industry fall by 46% in Brazil and 96% in the Russian Federation. Similarly, imports of electrical equipment into the communications sector fall by 13% in Brazil and 98% in the Russian Federation. These lead to an overall decline in imports to Brazil of 5.08% and to the Russian Federation of 9.25%. Imports are replaced by an increase in domestic production and reduced exports and redistribution of domestic supply of those inputs from other sectors in both countries.

The reduction in import demand lowers import prices relative to export prices. This increases the terms of trade leads to an appreciation in the exchange rate. As with the coal, oil and gas LCR in Kazakhstan, the currency appreciation lowers import costs generally. While the LCR is targeted at electrical equipment and machinery and equipment, imports of every other input into the communications industry increases slightly in both Brazil and the Russian Federation.[30] However, these slight increases are outweighed by the relatively large reductions of electrical machinery and machinery and equipment imports, leading to a net reduction in imports to the communications sector shown above.

The increase in production in communications, electrical machinery and machinery and equipment leads to an increase in employment. The boost is significant in the electrical machinery and machinery and equipment sectors where employment increases by 0.09% and 0.13% in Brazil, respectively, and 0.12% and 0.38% in the Russian Federation, respectively. The employment effects in the communications sector are more modest with an increase of 0.01% in the Russian Federation and Brazil.

Sectors that are inputs into the electrical machinery, machinery and equipment, or communications sectors in Brazil and the Russian Federation slightly expand output as production in the targeted sectors increase. Production in the remaining manufacturing and agriculture sectors contract as factors are shifted towards the expanding sectors. The effects on the other sectors are slight, with other transport equipment experiencing the largest reduction in production of -0.03% in Brazil and -0.01% in the Russian Federation, while trade services experiences the largest increase - 0.01% in Brazil and in the Russian Federation.

The communications LCRs have a low impact on other countries. Communications is a services sector with a relatively low level of exposure to international markets, though it is an important input sector to a number of internationally exposed industries. This suggests that the changes in production and trade in the communications industry in other economies are more likely to be affected by the larger LCRs that are imposed on more internationally active sectors. The trade flows in electrical machinery and machinery and equipment are slightly displaced as a result of the LCR. Brazil and the Russian Federation's reduction in electrical equipment intermediate imports are shared by a reduction in exports by all of the regions in the model. Trade

30. Imports of inputs of every other commodity into every other industry increase slightly in Brazil, and the overwhelming majority do in the Russian Federation.

in other manufacturing also has a low level of displacement, however, some countries have slight export increases, because of a depreciation of their currency.

Electricity

The LCRs imposed reduce imports into India's electricity sector by nearly 50% (Table 6), all of which can be attributed to India's own LCR (Annex Table C5). It also leads to an increase in production costs (0.33%), raising the domestic price of electricity. This, in turn, makes electricity imports relatively less expensive to other sectors and users in the economy. This is reflected in a net increase in imports of electricity for both intermediate (1%) and household (0.8%) use (Table 7). India's electricity sector subsequently experiences an overall decline in output of 0.26%, as well as a decline in exports to both intermediate and household markets.

However, the LCR does induce an increase in output of India's coal, oil and gas sector, the primary input into the electricity sector. This increase comes from a shift away from other domestic uses of coal, oil and gas as well as decreases in India's exports (-0.3%). The increase in domestic production of coal, oil and gas leads to an increase in intermediate inputs demanded by the sector. However, this expanded domestic activity is offset by a relatively large increase in imports of coal, oil and gas to households (12%), who can more easily switch to the relatively cheaper imports. As India's share in electricity markets is small, no large movements among trading partners is observed. Exports for intermediate use go down to India's three major trading partners (the United States, European Union and ROW) but have little effects on these domestic markets. However, there are effects from the changing demand in India's coal, oil and gas sector. The large increase in output in this sector leads to declines in output of this sector in other markets, with G20 and the rest of the European Union being the most affected (declining production of -0.03%, Annex Table C5).

Despite this decline in output and exports in the Indian electricity sector, an increase in labour demand is observed. This is due to a substitution in the industry away from other inputs to labour. In an economy with unemployment (as is assumed here) industries can increase their demand for labour without affecting wage rates. This occurs until full employment is reached and then wages start to adjust. However, the increase in the use of labour by the electricity sector is quite small, and does not affect the overall level of unemployment, as shown in the first panel of Table 6.

Food products

The LCRs imposed by Kazakhstan on its agriculture and food sectors are quite sweeping. They cover the use of agricultural goods and food stuff as an input across all sectors of the economy. Despite these broad-reaching policies, there are relatively small changes in macroeconomic outcomes. While the LCRs focus on the use of food products in other sectors, it does not cover imports to the food sector itself, other than agriculture. In turn, imports to the agriculture activity are also not prohibited. Thus imports to the food products industry go up (0.19%) as do the imports of agricultural commodities to the agriculture sector (0.1%) while imports of food products to both intermediate (-13.3%) and households (-15.96%) go down, leading to an overall decline in imports (-0.10%) due to these LCRs (Table 6). GDP increases but much of this increase can be attributed to the large gains made by Kazakhstan's motor vehicle components exports to Russian households as a result of the LCRs imposed in that economy and Kazakhstan's own sub-soil LCRs.

Domestic production for both agriculture (0.20%) and food products (0.9%) increases as a result of the LCR, as do transport (0.1%) and other business services (0.05%), major inputs to these sectors (Annex Table C6). This then leads to a small increase in the price for agriculture, while the price for food products declines slightly (-0.03%). The reason for the relatively small

impact of these policies on prices is due to a drop in the price for the major inputs of these sectors. Because the LCRs are focused on commodities consumed and not the production of these products, the major inputs into the food industry, such as transport and business services, are able to increase their imported inputs to meet the new higher demand for their outputs. There is no impact on exchange rates as a result of this LCR, thus the relative price change is coming from an increase in the relative price of domestic agricultural goods and a relative decline in import prices. This then leads to a small decline in production costs (-0.03%).

There are few spillover effects from these measures. The Russian Federation decreases its exports of food products in response to Kazakhstan's increase as does the rest of the world, but by very small amounts (Annex Table C6). Other markets are not affected.

Insurance

More than most other sectors, LCRs that affect the global insurance sector flow from two sources. The first are those that directly target the industry (Argentina's reinsurance LCR) and the second are those that indirectly require domestic sourcing of insurance as an input to a targeted sector (e.g. Kazakhstan's cog). Looking at the affect from all LCRs, output of the insurance sector increases in all regions implementing direct or indirect LCRs. While imports are reduced in Argentina (as expected) they increase in the other regions indirectly targeting insurance.

The total effect of LCRs on the insurance industry in Argentina is as expected. Domestic production increases (0.41%, Table 6) with outputs to intermediate use increasing (1.84%) at the expense of imported intermediates (-3.26%, Table 7) and insurance for households (-0.51%). The increased production leads to an increase in employment in the insurance sector (0.40%, Table 6).By restricting the level of imported intermediates, the LCR increases demand for domestic intermediates, increasing the supply price (0.04%). This increased price raises the costs to other uses and sectors.

When the effects of the direct LCR are considered in isolation, we see that production in other services sectors also increase. The insurance industry is a service industry and draws its inputs relatively more from other services industries than manufacturing or agriculture. This means that as production increases in the insurance industry then the production of its inputs will also increase. Production increases require additional resources, which must be shifted from the remaining sectors with subsequent falls in production.

In addition, Brazil, Indonesia, and Kazakhstan have implemented LCRs that affect the insurance sector as an input to other target sectors. The increase in demand for insurance as an input to other industries can be met in three channels. Domestic production can increase, imports can increase, or exports can be reduced. In the cases of Brazil, Indonesia, and Kazakhstan the increase in demand for insurance inputs is met through all three channels. The production increase in these countries ranges from 0.05% to 0.84%. Exports fall between 0.03% to 0.67%, and imports increase between 0.07% and 0.84% (Table 6). These shifts are supported by currency appreciations in each country that lower the cost of imports, as well as a relatively stronger domestic than export price which encourages production to shift from foreign to domestic markets.

Motor vehicles

Three countries have implemented LCRs in the motor vehicles sector since the crisis, namely Brazil, the Russian Federation and Venezuela. In addition to these direct LCRs, this industry is affected by many of the other LCRs, as discussed above. For all motor-vehicle LCR-imposing countries, GDP increases, albeit slightly and trade decreases (Table 6). The effects of the LCR are similar in the different countries with the size varying depending on initial import levels and the nature of the LCR. The Russian LCR shows the largest impact, increasing the

domestic share of motor vehicle components (intermediate inputs, hereafter mv-components) in the Russian motor vehicle production (hereafter mv-production) from 5% to 60%. In Brazil, the LCR in the motor-vehicle sector translates into an 86% domestic input requirement for all machinery and goods into mv-production, starting from domestic shares between 44% and 70% for the most important inputs. In Venezuela, the LCR does not appreciably change the domestic share of intermediate inputs (Figure 2).

Mv-components are the most important intermediate input into mv-production, accounting for 38-50% of total intermediate input use, but are also produced by mv-producers themselves. Thus the LCRs increase, through the demand for intermediate inputs, the production of the targeted sector. These increases are in line with the amount of domestic input production needed to meet the LCR (Figure 2) namely 3.9% for Brazil, 19.2% for the Russian Federation and 1.3% for Venezuela (Annex Tables C4, C9 and C10, respectively). However, as mainly intermediate input production increases, there is a structural change within the sector with expansion of the input-supplying firms at the expense of end-users in the motor vehicles sector.

As domestic mv-production increases, an increase is observed in the supply of mv-components while the supply of motor vehicles for final consumption decreases due to price increases. As is observed for other LCRs, part of the original decrease in import demand induced by the LCR is absorbed by increasing import demand in non-targeted sectors and other use categories (Table 7). However, total imports of motor vehicles across all uses still declines.

In the Russian Federation, the policy-induced increase in demand increases mv-production, despite the increasing costs of intermediate inputs. These cost increases are driven by a strong increase in domestic mv-component supply prices, pushing mv- production costs up by 2.4% (Annex Table C9). In Venezuela and Brazil, where LCR effects are clearly smaller, production costs fall, largely owing to declining intermediate import prices. As prices for domestic supply of mv-components increase, producers lower export prices and increase their exports.

As mv-production expands, factors shift from other sectors to mv-production leading to a decline in output in most of the other sectors. Mv-component imports decreases, while exports increases and the exchange rates appreciate to balance the capital account and maintain the current account balance. As mv-component production captures more of domestic capacity, all but the LCR-restricted imports increase. However, the decline in LCR-restricted imports dominates and the total value of imports decreases in all three countries. On the export side, the increase of mv-exports is not strong enough to dominate total exports, which decrease. The increased output of mv-production increases factor demand and unemployment slightly decreases.

Macroeconomic effects on other regions are small with most of the impact being felt specifically in mv-production. All imports of the Russian Federation, Brazil and Venezuela decline and at the same time their exports of motor vehicles increase. The Russian Federation is able to strongly extend its exports to India, Kazakhstan and the Rest of the World, displacing other trade partners. Considering the Russian Federation's LCR in isolation (Annex Table C9), exports increase nearly 30% while production in, and exports from, all other regions, except Kazakhstan (discussed below) fall. One of the biggest impacts is on the G20 where motor vehicle production falls 0.35% and exports decline 0.5%. This change in mv-components trade results in decreasing production of mv-components in all non-LCR regions.

Two countries are especially affected by LCRs imposed by a trade partner country. First, the Russian LCR affects Kazakhstan relatively strongly, as the Russian Federation is its main trading partner and Kazakhstan is a relatively small country. While the production of intermediate inputs (mv-components) decreases, in general, Kazakhstan increases its production of final goods and increases the exports of motor-vehicles for final consumption to the Russian Federation, albeit off a small base (Annex Table C9). Second, Argentina is affected relative strongly by the

Brazilian LCR. Brazil is the destination of 65% of Argentina's mv-component exports which drop 24% leading to a shrinking mv-production in Argentina of -3.7% (Annex Table C4).

Other minerals

Kazakhstan and Argentina have implemented LCRs in their mining industries. Argentina requires that all transport services used by that industry must be locally sourced, while Kazakhstan requires that 16% of the inputs from goods sectors, and 85% of inputs from services sectors are locally sourced. In Argentina the LCR affects both water transport and other transport services. In Kazakhstan, motor vehicle, insurance and other business service inputs into the mining sector are affected. The level of local content in the other inputs already exceeds the mandated level in the LCR.

The effects from the Argentinian LCR are small but act as expected. Imports of transport services into the mining sector fall. The gap in supply is met through increased production and a substitution of domestic transport services into the mining sector and away from the other industries. There is an increase in imports of transport services into these other sectors (Annex Table C2). The substitution is caused by an increase in the price of those inputs, which is driven by the LCR.

The effects of the Kazakhstan LCR in the mining sector tell a different story. When looking at the Kazakhstan LCR in isolation (Table 7, Annex Table C7), we see that production in the mining sector decreases, by 0.1%. This reduction is caused by the changes in the economy that are necessary for the motor vehicle, insurance, and other business services sectors to meet the LCR.

The change for the motor vehicle and insurance sectors is significant. The domestic supply of these inputs into the mining sector increase by over 407% and 51%, respectively, albeit from a low base. This increase in domestic supply can be met by increasing production or shifting inputs from other sectors into the mining sectors. In this case, domestic production in the motor vehicle industry increases by 3% (including a 17% increase in motor vehicle intermediates production) and 0.7% in insurance. While motor vehicle and insurance inputs into the mining sector increase dramatically, they fall across every other sector, leading to an overall decrease of 2.7% (Annex Table C7).

The motor vehicles and insurance sectors expand by attracting factors of production and other intermediate inputs through higher relative prices. This means that the resources are not available for the mining sector to expand, or even maintain, their own production. The other sectors that expand production are those that supply inputs into the motor vehicles, insurance, and other business services sectors. These are primarily services sectors, but also include textiles and food products. Indeed, services expand production by 0.11%, increase imports by 1.06% and decrease exports by 0.14% (Annex Table C7).

Water transport

The Indonesian LCR on cabotage translates into a 98% LCR on the use of water transport as an intermediate in all sectors and in the final consumption of households. Effects on the whole economy are small and effects on trade partners are negligible (Tables 6 and 7), as would be expected per Figure 2. The effects are similar to other LCRs, but on a smaller scale. Water transport imports are small in the base (import shares of 4% for intermediates and 7% for households) and the strong decrease must be related to a small base. Domestic supply of water transport services increase. Similar to other LCRs, exports of water transport services increase which becomes possible through price differentiation (Annex Table C11).

3.3.2 Price preferences

There are three quantifiable measures where the local content requirement is associated with a tax break or price support measure, as depicted in Table 9. The Brazilian national broadband programme removes federal excise taxes and social contributions when network equipment and civil work services are sourced domestically. In addition, Brazil has a special regime for the development of the fertilizer industry, allowing for a tax break on sales of domestic machinery, electrical equipment and construction services to this industry. Indonesia eliminates tariffs on machinery, goods and materials used in the motor vehicle assembly and components industry when companies purchase at least 30% of the total value of machines domestically. As described in Section 2.4, for quantification the tariff cut is interpreted as a price preference on the use of domestic commodities and thus is similar to a cut in sales taxes on domestic products.

Table 9. Price preference measures

Measure	Targeted sector	Affected commodities	Tax rate (%)
Brazil national broadband programme	Communication services	Electronic equipment	13.0
		Construction	2.7
		Communication service	6.5
Brazil development of fertilizer industry	Fertilizer (in Chemical, rubber and plastic products)	Machinery and equipment	9.0
		Electronic equipment	13.0
		Construction	2.7
Indonesia motor vehicle assembly and components industry	Motor vehicles	All machinery, goods and materials	0.2 - 4.8

Source: Author's calculations based on OECD Trade Model Database.

Effects on the macro economy are only apparent in Brazil and relate to the national broadband programme, which increases real GDP by 0.14% (Table 10). Macroeconomic effects of the other two measures are negligible.[31] The price preference measure decreases the price for domestic inputs and imports become relatively more expensive. Accordingly, firms shift their input demand away from imports to domestic goods. The costs for intermediate inputs decrease and prices fall in the targeted sectors which increase domestic and export demand for these goods in all uses. The effects are shown in two tables on the following page. Table 10 shows the macro effects and Table 10 focuses on the effects on the sectors within the implementing country.

When intermediate input prices fall strongly relative to wage rates, there is the danger that firms substitute primary factors and use more intermediate inputs in the production process. This effect can be observed in the case of the national broadband programme where labour demand falls in communication by -0.31%[32] (Table 11). However, the drop in the price for communications leads to an increase in its demand as an input generating increases in production in other sectors as well, especially the ones which produce the price preference affected commodities. Overall factor demand increases and unemployment in Brazil decreases slightly (Table 10).

Imports of affected commodities decrease due to the price preference for domestic goods. For the national broadband programme in Brazil, increased production and related income

31. There is no measureable interaction between the two Brazilian measures.

32. Without unemployment, the substitution effect will be stronger in the face of wage increases.

increases cause overall import demand to go up by 0.09%. For the other two measures there are virtually no overall trade effects, small changes in single commodities are directly offset through substitution effects. The Brazilian national broadband programme affects its trade partners, especially Argentina. Argentina, for which Brazil is an important export market, benefits from Brazil's increased import demand, especially for motor vehicles.

Table 10. Macro effects of price preference LCRs

Percentage change

	Brazil broadband program	Brazil fertilizer industry	Indonesia
GDP	0.14	0.02	0.01
Imports	0.09	-0.01	0.00
Exports	0.13	-0.01	0.00
PPI	0.01	0.00	0.00
Unemployment	-0.03	0.00	0.00
Exchange rate	0.08	-0.03	0.00

Source: Author's calculations.

Table 11. Sector effects of price preference LCRs

Percentage change

	Agriculture	Coal, oil, gas, minerals nec	Other minerals	Food products	Textiles, wearing apparel, leather	Chemical, rubber, plastic prods	Transport products	manufacturing equipment	Motor vehicles and parts	Electronic equipment	Other manufacturing	Electricity	Construction	Transport	Water transport	Insurance	Trade	Communication	Business services	Recreation and other services	Other services
	Brazil national broadband program																				
Production	0.08	0.09	0.10	0.12	0.19	0.24	0.14	0.14	0.14	0.50	0.21	0.25	0.05	0.26	0.17	0.26	0.24	1.18	0.52	0.24	0.12
Production cost	0.15	0.15	0.11	0.10	0.06	0.07	0.05	0.05	0.06	0.00	0.09	0.09	0.07	0.05	0.06	0.01	0.04	-1.17	-0.02	0.00	0.02
Exports	-0.06	-0.17	0.05	0.04	0.17	0.18	0.20	0.15	0.14	0.34	0.15	0.00	0.00	0.34	0.24	1.32	0.00	2.13	0.48	1.59	0.30
Interm. imports	0.21	0.44	0.22	0.17	0.09	0.17	0.13	0.17	0.14	-1.21	0.21	0.21	0.15	0.26	0.24	0.16	0.19	-2.52	0.28	0.39	0.20
imports	0.00	0.47	0.00	0.28	0.00	0.18	0.00	0.00	0.09	-0.95	0.22	0.41	0.00	0.20	0.35	0.00	0.73	0.00	0.31	0.49	0.00
Labour demand	0.12	0.13	0.12	0.23	0.26	0.33	0.20	0.20	0.21	0.50	0.33	0.37	0.15	0.35	0.27	0.27	0.31	-0.31	0.49	0.24	0.14
	Brazil fertilizer industry																				
Production	0.01	-0.01	0.02	0.01	0.02	0.14	-0.03	0.23	0.01	0.08	0.03	0.04	0.00	0.03	-0.02	0.02	0.03	0.03	0.02	0.02	0.01
Production cost	0.00	0.00	0.01	0.00	0.00	-0.09	-0.01	-0.01	-0.01	-0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Exports	-0.06	0.00	0.00	-0.08	0.00	0.18	-0.20	0.15	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00
Interm. imports	0.07	0.14	0.11	0.09	0.09	-0.06	0.00	-0.87	0.07	-0.30	0.12	0.11	0.02	0.07	0.08	0.08	0.08	0.07	0.07	0.06	0.07
imports	0.00	0.19	0.00	0.00	0.00	-0.07	0.00	-0.32	0.09	-0.21	0.13	0.41	0.00	0.00	0.00	0.00	0.36	0.00	0.15	0.00	0.00
Labour demand	0.01	-0.01	0.02	0.01	0.01	0.02	-0.05	0.22	0.00	0.07	0.03	0.05	0.01	0.04	-0.01	0.03	0.04	0.04	0.03	0.03	0.02
	Indonesia motor vehicle industry																				
Production	0.00	-0.01	0.01	0.00	-0.02	0.00	0.10	0.08	0.74	-0.05	0.01	0.01	0.00	0.03	0.08	0.01	0.01	0.01	0.01	0.01	0.00
Production cost	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	-0.32	0.00	0.00	0.00	0.00	-0.01	0.00	0.01	0.00	0.01	0.01	0.00	0.01
Exports	-0.31	-0.04	0.00	0.00	-0.14	0.00	0.00	0.00	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interm. imports	0.02	0.04	0.02	0.03	0.01	0.03	-0.04	-0.04	-0.80	-0.02	0.02	0.04	0.03	0.03	0.08	0.03	0.02	0.04	0.02	0.02	0.03
imports	0.00	0.16	0.00	0.00	0.00	0.07	0.00	0.00	-0.23	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour demand	0.00	-0.01	0.01	0.01	-0.02	0.00	0.11	0.08	0.33	-0.04	0.02	0.02	0.01	0.02	0.09	0.01	0.01	0.02	0.01	0.01	0.01

Source: Author's calculations.

Thus, the price preference policy in Brazil seems to stimulate domestic demand and trade partners benefit from increased import demand in other sectors of the economy. The positive effects come mainly from the situation that this policy, while introducing a bias between domestic and imported goods, decreases existing distortions in form of taxes.[33]

3.3.3 Other measures

The remaining market access measures are referred to as 'protection' and 'establishment' measures. As discussed in Section 2.3, protection measures refer to those where:

- local inputs make a significant contribution to the current input mix of the industry, *and*
- the specified share of local content in the LCR is *less* than the existing level of local content in the industry.

The measures aimed at protecting the local industry include five television and film LCRs, a Brazilian LCR applied to its oil and gas sector, two Indonesian measures in its telecommunications sector, and one in Indonesia's energy sector. Given that these measures are non-binding, they have no immediate impact on the relevant industries, as they are set below the existing level of local content.[34] Instead, by setting a minimum level of local content they provide a form of protection to local producers. The modelling approach in this situation would be to provide a counter-factual to the LCR. For example, a third-party country, identified as well-regulated and open in the relevant sector, could be used as an example of an 'open' import market share. The level of local content in the open economy could be applied to the sector in the implementing country allowing a discussion of the relative costs associated with the LCR.

Identifying such a reference country, or group of countries, is difficult. Not only would certain aspects of the macro economy need to be consistent, but to provide an accurate base, the sectors in both economies would need to have similar cost structures. Otherwise, differences attributed to the LCR could more accurately be a function of the different input structures stemming from different technologies. Given the challenges associated with finding relevant, statistically significant comparison points, these measures have not been quantified.

The final group of measures, referred to as 'establishment' measures, apply to situations where no significant local industry existed. The three measures are related to the development of Ghana's petroleum industry, to an LCR in India's solar energy sector and to a wind-turbine measure in Brazil. Modelling these measures would involve building industry structures into the base data, assuming cost structures and all trade relationships. Given the highly speculative nature of this approach, these measures were also not subject to quantification.

3.3.4 Model interpretation: Considerations and context

We have quantified the effects of a number of specific LCRs on trade partners and the macroeconomy, and analysed the spillover effects in the trade community. A CGE analysis is

33. The detailed discussion of the potential impact of tax replacement policies and the impact on government spending is beyond the scope of this paper.

34. Beghin and Sumner (1992) show that such an LCR can incentivise up and downstream domestic producers to cooperatively bargain about the distribution of profits. Typical LCR analysis shows that final producers lose when an LCR is binding. Governments can use non-binding LCRs to signal their willingness to regulate an industry. This signal provides an incentive to downstream firms to negotiate with the upstream firms a better outcome than they would receive under a binding LCR. The effect of the non-binding LCR is then a greater share of profits for the upstream firm.

employed for the quantification of these effects, as the ability to capture economy-wide impacts, as well as track these effect across trade partners, is the strength of these types of models. However, there are several issues which must be kept in mind when considering the modelling process applied in this study. First, the level of aggregation, second the role of multinationals and third the sensitivity of the results to the underlying assumption of the model.

As noted in Section 2.3 the majority of the LCRs are imposed on very specific sectors of an industry, sometimes at the 8 digit HS level. By comparison, the modelling structure applied here only allows for examination of these effects at a highly aggregated level (2 digit HS). This leads to an understatement of the impact on a specific subsector or specific country/sector pairings. For example, India's LCR on its Mega Power Projects applies to coal powered electricity generation which is part of the electricity sector in the model. The adjustment applied in the model must be scaled to reflect the share of the market to which the LCR applies. This means that the impact measured is the impact on only a (often small) part of the modelled industry. To the specific activity (in this example, coal-fired power stations), the effect of the LCR is stronger than the model implies. This does not imply that the size of the impact represented by the model outcomes is necessarily mis-stated, but its impact is muted when aggregated over the entire sector.

It is also highly likely that across the board, the impact of LCRs falls disproportionately on multinationals (MNEs). These firms tend to import and export more intensely than their domestic-only counterparts. Thus, any measure which affects a firms' ability to import their supplies will have a larger impacts on MNEs. The model employed does not explicitly consider MNE activity. Rather these activities are imbedded in the trade statistics and sector cost structures that are observed in the overall data. Given the degree of MNE dominance in each sector, however, dealing with averages across sectors may distort the results.

However, 'average' only applies to the firm behaviour assumed in the model. The base data are not averages, rather the total of all activity in a sector, domestic and foreign. So if the LCR is binding, this is true regardless of who (domestic or MNE) is doing the importing. It matters if we were determining the relative burden of the adjustment, but not to the overall amount of goods being imported. However, given the behavioural equations are based on the 'average' firm, the import values implied by these equations may be biased downward to the extent that the sector is dominated by MNE activity *and* these MNEs import at a higher intensity than domestic firms in that sector.[35]

Finally, the outcomes of the model are dependent on the underlying assumptions of the modelling structure. One area where trade is especially sensitive is with respect to estimations of elasticity. These estimations determine the degree to which domestic sources are willing to substitute foreign inputs. Thus they are quite important for any interpretation of the LCR results. A sensitivity analysis of trade elasticities was undertaken in conjunction with the modelling work presented here. A range of elasticity estimates were tested to determine the robustness of the results. Implementing a range around ± 15%, the results were not significantly changed.[36] In addition, there are several issues which do not readily lend themselves to quantification but would affect the results presented here. These include the fact that LCRs can attract high cost foreign firms eroding competitiveness beyond what is measured. These high cost firms are those that do not currently have the lowest cost supply chain. This means that they enjoy relatively lower switching costs between their existing supply chain and the domestic supply chain. The degree to

35. The LCRs that are quantified above fall in countries and sectors with seemingly low levels of MNE activity. Drawing on the Foreign Affiliate Sales Database developed in Fukui and Lakatos (2012), the displacement measures modelled above are applied in countries and sectors that account for 0.5% of all global FAS activity.

36. See Annex D for details of the various sensitivity analyses undertaken.

which each individual market is contestable will also determine the effects of the LCR. For example, not all countries are able to make and export the same commodity. Attempting to develop a domestic industry when the global supply already has excess-capacity is unlikely to be successful. Finally specific potential benefits associated with technical transfer or economies of scale are not developed in these results.

3.4 Qualitative assessment

3.4.1 Local content requirements in government procurement

Government procurement (GP) is the purchase by governments and other government organisations of goods, services and works such as infrastructure projects (OECD, 2013e). It is a subset of total public expenditure which is the total actual spending of the government, including all expenditure of central and local government agencies (Lequiller and Blades, 2006). In 2011 the level of GP in OECD economies was, on average, 13% of GDP, while the level of total government expenditures was, on average, 45% of GDP (OECD 2013a and 2013e).[37] This implies that the majority of government expenditure in OECD economies is not related to the purchase of goods, services, and works, but on other expenditures especially social insurance and welfare payments.

There have been few attempts to directly estimate the size of the GP market. In terms of global estimates, Audet (2002) estimates the size of this market across 134 countries to be between 15% and 20% of GDP. The OECD (2011b) finds the average size of GP markets to be 12% of GDP in 2008 with a range from 5.1% to 21.8% for OECD countries. Both estimates rely on national accounts data, which may over estimate the size of the GP market as there is no certainty that all expenditure in the included sections will be related to procurement (Chen and Whalley, 2011).

Table 12. Government procurement markets in selected countries and regions

Country	Year	Estimate (USD, b)	Source
European Union[a]	2007	2 871	Anderson et al. (2011)
United States	2008	1 679	OECD (2011), IMF (2013)
Other OECD	2008	1 346	OECD (2011), IMF (2013)
China (People's Republic of)	n.a.	1 020	Anderson et al. (2011)
India	2009	348	Anderson et al. (2011)
Indonesia	2008	47	See Annex
Viet Nam	2008	22	See Annex
Chinese Taipei[b]	2009	20	Anderson et al. (2011)
Kazakhstan	2010	4	Tengri News (2012)
Argentina	2005	3	WTO (2007)
Total		7 359	

a) EUR 2 088b converted to USD at (EUR 1 = USD 1.38).

b) Chinese Taipei's GPA market access commitments only, representing a portion of the total Chinese Taipei GP market.

37. 2013 statistics for government procurement are due to be published in 2015.

As an indicator of the size of GP markets, Anderson et al. (2011) report a number of estimates across a range of countries. This list is expanded on below by incorporating the OECD country estimates for 2008 (OECD 2011b), as well as work on specific measures detailed in Annex E. Table 12 shows estimates of the size of the GP market in 47 countries, and their sources. The combined size of the GP markets across these 47 countries is nearly USD 7.36 trillion.

GP and policy objectives

"Value-for-money" is one of the most common objectives for government procurement (Hoekman and Evenett, 2013). This objective can either focus on minimising costs while meeting specific quality requirements, or maximising the quality of procurement within a price range. These concepts can diverge when a government has market power, resulting in an under allocation of resources to the production of a particular product and a less efficient outcome than achieved in a competitive market.

GP preference policies have been commonly used by governments (including central, state, and local governments) to meet socio-economic objectives, such as supporting small-and-medium-sized enterprises, green-growth, employment, and innovation. Indeed, domestic preference purchasing schemes have been just one of the tools that governments have used to achieve a variety of 'social and political purposes' for more than 200 years (Qiao et al., 2009). More recently, in response to the financial crisis, governments have increased the use of 'home bias' procurement policies for these socio-economic objectives (OECD, 2013c; Kattel and Lember, 2010). While the objectives of domestic preference schemes are broad, most centre on industrial objectives, national security, strategic economic goals, such as regional economic integration, or other non-economic objectives (Evenett and Hoekman, 2005; Ssennoga (2009)). More direct, discriminatory GP could be specifically used to counter agglomeration forces when markets become more integrated due to falling trade costs (Trionfetti, 2000).

Weiss and Thurbon (2006) argue that an important objective for domestic preference policies is related to trade strategy. They argue that governments use procurement in trade strategy in two stages. First, preferential GP provides their domestic companies with a secure sales base from which to expand overseas. Secondly, the government negotiates greater access in foreign GP markets for their firms to prosper.

A key question for policy makers is whether the specific LCR is an efficient way of attaining the underlying objectives of the policy. The OECD (2013c) notes that the trade-offs and opportunity costs of pursuing socio-economic objectives with GP should be made explicit. The study notes two key risks to be considered when using GP as a policy tool. Discriminatory procurement policies risk (1) disrupting the efficiency of the procurement process and (2) distorting fair competition in the marketplace more generally. These risks should be addressed within the policy framework before implementing an LCR and governments should actively monitor the implementation of these measures.

Factors affecting the impact of GP LCRs

There is a small but focused literature on the effects of discriminatory GP policies[38] that shows that its effects depend on the market structure of the affected sectors, the relative size of GP in each sector, and the state of complementary policies such as competition policy. In general, GP LCRs can reduce the level of competition in the market. The LCRs reduce the number of eligible firms that can enter the market and gives market power to those firms already there.

38. This literature tends to use partial equilibrium analysis. Thus the discussion focuses on the effects only in the implementing sector and not how other sectors in the economy will be affected.

Firms with market power reduce their output and employment, and increase profits to earn monopoly rents (Hoekman and Evenett, 2013).

In a perfectly-competitive market discriminatory procurement affects trade and production if GP in a sector is greater than domestic supply (Baldwin, 1970). Miyagiwa (1991) finds similar results for an oligopolistic market. When GP is less than domestic supply, all else equal, a discriminatory policy shifts GP from foreign to domestic suppliers and shifts private procurement from domestic to foreign suppliers with no net impact on trade or production. When GP is greater than domestic supply, then a discriminatory policy forces an increase in domestic supply, which has a positive impact on production but a negative impact on trade. Assuming increasing returns to scale or monopolistic competition, Trionfetti (2000) shows that discriminatory GP increases domestic production and harms trade regardless of its relative size in the sector.

Evenett and Hoekman (2005) contrast the long and short-run effects of discriminatory procurement, in perfectly-competitive markets. They do this for discrimination that includes an outright ban on foreign supply and one that provides a price preference for domestic producers. They show that in the long run, as well as the size of GP in a market, policies that support the entry and exit of firms (e.g. competition policy) are key to determining the effects of discriminatory procurement policies. Their findings lead to the conclusion that a country could, in theory, use discriminatory GP policies to develop a domestic industry, if the government is of a significant size and it has appropriate competition policy settings. This industrial development will come at the expense of foreign suppliers and could result in higher prices in the domestic market.

Role of the WTO Government Procurement Agreement (GPA)

The WTO GPA is relevant to GP LCRs because it can limit their impact. Signatory countries that implement LCRs are required to apply the national treatment principle to bids originating from other members, protecting these other members from discriminatory policies with respect to those entities/sectors where they commit to national treatment. The GPA is a plurilateral agreement covering the GP markets of 43 WTO members (counting the European Union and its 28 member states as one party). It acts as an insurance policy to maintain market access for the exporters from signatory countries (Anderson et al., 2012). It is a binding agreement that prevents acceded governments from implementing, amongst other things, LCRs limiting the market access of other Parties, although only with respect to those entities/sectors where commitments have been undertaken. The plurilateral nature of the agreement means that it is only legally binding on its signatories. WTO Members are not automatically bound by the GPA but elect separately to accede to it.

When acceding to the GPA, countries have a large degree of flexibility in setting the level of their commitments. They can limit their coverage in four ways. First, they choose whether to be a *member*. Secondly, they choose the *entities* across all levels of government that will be covered by the agreement (such as central, sub-central, specific agencies, ministries or other organisations). Thirdly, countries can limit the types of *goods, services and construction services* that will be affected by the agreement. Finally, they can set the *threshold* which a contract must exceed before being covered by the agreement. A threshold can be set for each mix of product, service, construction service, and entity covered under the agreement (Chen and Whalley, 2011). Additional flexibilities exist for developing countries.

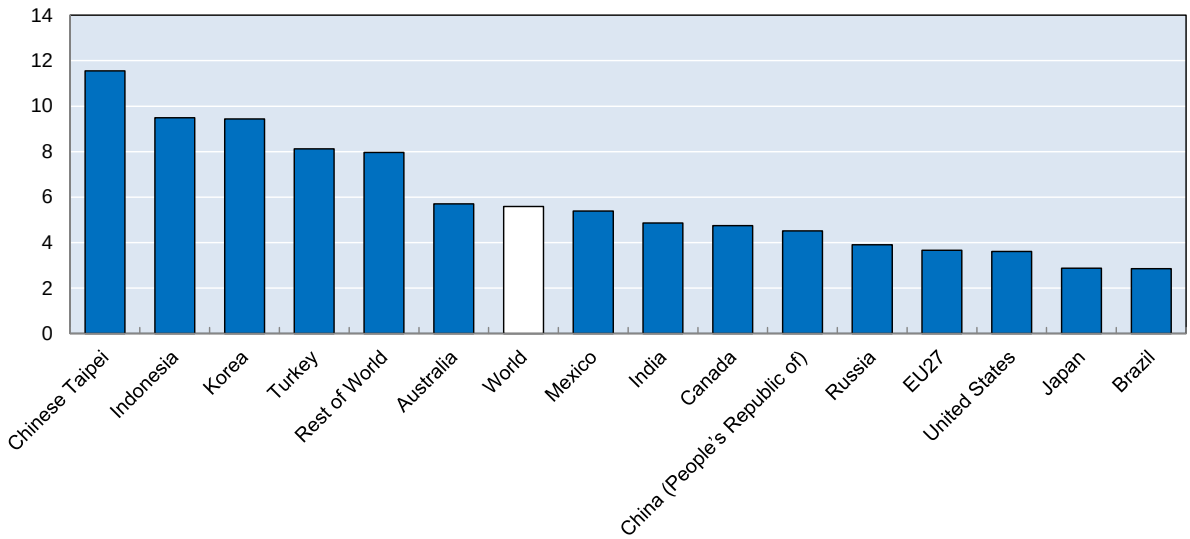
There are, thus, significant variances in Member's GPA commitments, and many Members have significant carve-outs which enable LCRs to be applied in key public infrastructure procurement consistent with GPA obligations. As LCRs become more widely used by some GPA Members, the gaps in coverage become more evident.

Import share of government procurement markets

Traditionally, foreign suppliers tend to have a small share of GP markets. Messerlin and Miroudot (2012) estimate the import share of GP markets for the countries included in the World Input-Output Database (WIOD).[39] In 2007, the year before the financial crisis, the foreign share of GP markets in the selected economies ranged from 3% in Brazil to 13.5% in Chinese Taipei. Figure 3 shows the average import penetration ratios for those countries between 1995 and 2009 with the global average being 5.6%. OECD (2013c) notes that this low level of penetration occurs even within transparent and integrated markets, such as the European Union. This low share could be due to the type of spending typical of most GP (e.g. construction) as traditional GP spending tends to focus on sectors with existing low import penetration, particularly services sectors (see also Evenett and Hoekman, 2005).

Information on the level of home bias in developing country GP markets is rare, with the exception of those included in Messerlin and Miroudot (2012). The home bias in GP markets is important when considering GP LCRs because it frames the scale of each measure's potential impact. If foreign suppliers contest only 5% of the GP market in a country, and that country imposes a USD 200 billion stimulus package with LCRs, then the expected impact of that package should not be the full allocation, but rather the USD 10 billion of procurement which importers can no longer contest.

Figure 3. Average import penetration of GP markets 1995-2009



Note: Rest of World is a world average excluding the 40 countries covered in the WIOD tables.

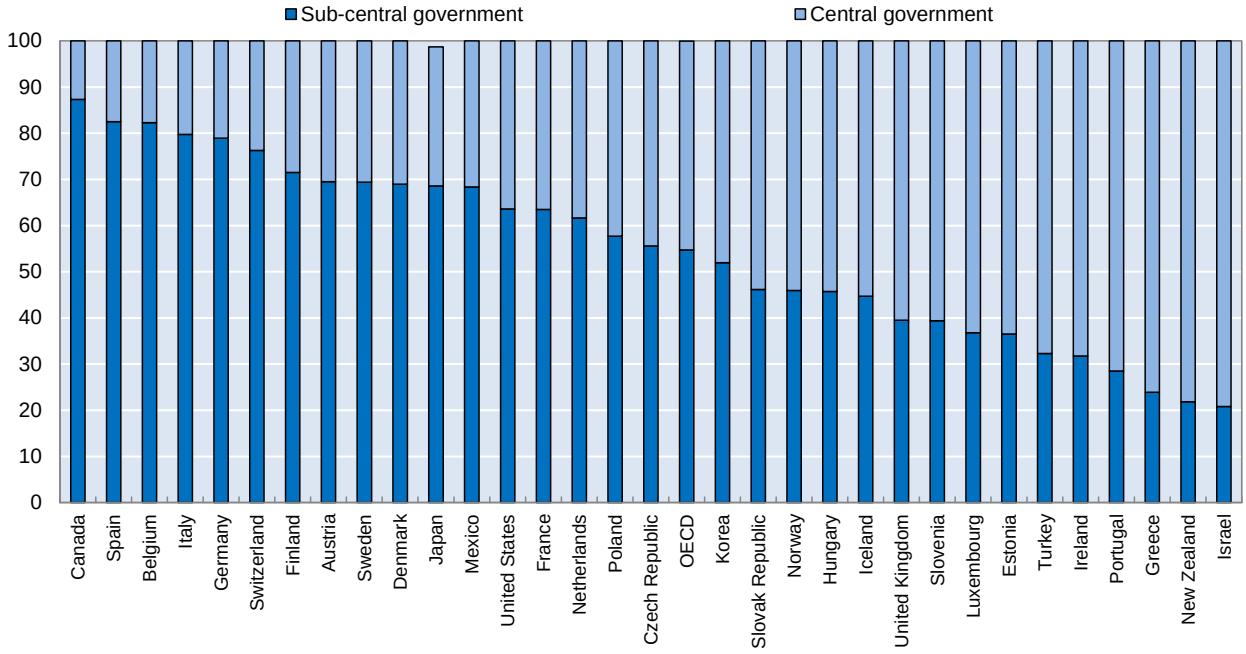
Source: Adapted from Table 2. Messerlin and Miroudot (2012).

39. They include in their analysis both the final consumption expenditure by governments and intermediate consumption by the sectors carrying out procurement procedures. It should also be noted that the methodology employed in this paper does not include government investment and social transfers in kind via market producer as well as utilities expenditures. Also, the assessment does not include procurement through affiliates as these are captured as domestic companies in the Input-Output framework.

Differences in GP at each level of government

The role of each level of government in managing their own GP policies differs across countries, as does the level of procurement spending itself (OECD, 2013e).[40] Figure 4 shows that, on average for OECD members, 55% of GP is at the sub-central government level. The sub-central government share of GP in the OECD ranges significantly from 21% in Israel to 87% in Canada. These shares have changed over time. Between 2000 and 2007 the share of procurement for sub-central GP in the EU was between 40% and 65% and between 40% to 85% in the United States (Chen and Whalley, 2011).

Figure 4. Share of general government procurement by level of government, excluding social security funds (2011)



Source: OECD (2013e), Figure 7.2.

The different roles of each level of government in managing their own GP policies are relevant to the impact of LCRs, with both positive and negative effects on the measure's impact. The potential impact may be reduced when the procurement of the implementing authority is a relatively small market. Alternatively, if an LCR is enacted by the central government, but the sub-central government controls their own procurement process, then the measure may not affect these lower levels of procurement activity, and vice-versa.

Overview of GP LCRs implemented since the crisis

Since the crisis, the domestic share of GP markets around the world increased due in large part to temporary measures enacted by governments. Using the WIOD, Messerlin and Miroudot (2012) show that the import penetration of GP markets fell from 2008 to 2009. All countries in the database (except Australia, Canada, India, and Chinese Taipei) experienced a more than 10% reduction in import penetration, suggesting an increase in procurement from domestic sources.[41]

40 The levels of government include central, state and local governments. Sub-central government refers to state and local governments.

41. This change in import penetration ratios is used indicatively only. Messerlin and Miroudot (2012) note that analysis of differences between these two 'unique and exceptional' years would be unwise, as the stimulus packages suggested as the driver of the change were not enforced

The shift towards domestic producers took place in an environment of increasing government expenditure in response to the crisis.[42] This suggests that not only did domestic producers capture a greater share of the procurement pie, but they did it while the whole pie was growing, which implies a much more dramatic increase in the level of domestic purchases. This implies that the decrease in import penetration was either caused by stimulus packages targeted at sectors that are already dominated by domestic producers (i.e. services), or by measures that discriminated outright against foreign competitors (i.e. LCRs).

GP LCRs in the database

The 74 GP related measures identified in the database represent just under a third of all the LCR measures implemented since 2008. Of those 74 measures, 63 are currently in-force and mandatory. Most of the remainder are either progressing through the respective domestic legislative processes (3), or were rejected by those processes (5).[43]

As shown in Table 13, the types of GP measures imposed since the crisis are evenly split between those where access to GP markets is dependent on a level of local content, and those that provide a preference to compliant bids. These two groups of measures fit within the two 'classical' forms of discrimination in public procurement – outright exclusion and price preference margin (Trionfetti, 2000). The measures implemented since the crisis remain largely in keeping with the 'classical' forms. This suggests that, unlike the industry focused measures, which have shifted from investment requirements to content requirements, policies pertaining to GP LCRs have not evolved since the crisis.

Both the market access and price preference LCRs are applied across all GP, at targeted economic sectors, or at the procurement of specific government ministries. They also cover all aspects of GP spending, including the procurement of consumable goods and services, as well as on long-term projects such as infrastructure works.

The specific details of the market access measures can be found in Annex A of the paper.

Table 13. Distribution of in-force, mandatory GP measures

		Intermediate inputs
Benefit	Market access	***31***
	Price preference	28
	Tax break or credit	2
	Government loans or funds or subsidies	2
	Grand Total	63

Source: Annex A.

Scale of potential impact of identified measures

As outlined in Section 1.2, the paper focuses on the set of measures that are expected to be the most trade distorting, those that clearly block market access. These are the 22 measures that

simultaneously. It should also be noted that a recent paper using TED data for the EU showed that the import penetration of EU peaked in 2011 (Kutlina-Dimitrova and Lakatos, 2014).

42. OECD (2011a) states that government expenditure's share of GDP across OECD countries increased by 4.9% between 2007 and 2009. It notes that part of this increase was related to falling GDP levels, but part was also related to the increase in expenditure in the face of the crisis. Though, austerity policies did lead to a reduction in government expenditure in some countries.

43. These measures were applied across all levels of government, including central, state, and local levels.

require a level of local content in production before a foreign firm can be eligible to enter a specific GP market.[44] Given a lack of quality data on GP available at this time, the discussion will apply a qualitative approach.

Despite the lack of detailed, consistent procurement data across countries, it is important to try and ascertain the extent of market exposure to LCRs. The level of GP that is covered by the 22 measures indicates the potential scale of procurement that could be affected by the emergence of GP LCRs. As noted, consistent and comparable GP statistics are scarce, and when available tend to be aggregated. Statistics for GP in sectors or sub-sectors are therefore found through an ad-hoc approach of individual government or company reports, or news articles. The details of process and sources used to assess the potential impact of each measure are provided in Annex E.

Table 14 below presents the US Dollar amounts of GP that could be potentially affected by each of the measures examined. The potential level of GP required to be sourced locally is USD 423 billion, representing approximately 6% of the level of procurement across the 47 economies shown in Table 12. The required level of locally sourced GP ranges from USD 1 million through to USD 261 billion. The sector specific measures, as a group, have the highest amount of potentially affected GP markets, with a potential value of USD 270 billion, driven by the scale of the American Recovery and Reinvestment Act of 2009.

Table 14. Scale of potentially affected government procurement

USD million

Country	Year	Description	Annual	Multi-year	Total
Government-wide					
Cambodia	2012	International bidding only over tenders of USD 200 000	n.a.		
Indonesia [1]	2010	40% of govt. purchases locally sourced	21 960		
Kazakhstan	2009	LC of 15% for goods and 20% for services	740		
Mexico	2010	LC of 65% for all govt. purchases by 2012	33 020		
South Africa [1]	2010	LC of 30% for projects over USD10m		16 135	
Viet Nam	2010	All GP must be domestically sourced, if available	21 619		
Total economy-wide			77 340	16 135	93 475
Economic sector(s)-specific					
India [1]	2012	IT software and hardware	1 817		
South Africa [2]	2011	Certain sectors reserved for LC	n.a.		
United States [1]	2009	ARRA of 2009, iron and steel, manufactures, TCF		261 000	[1]
United States [2]	2013	Purchase of American manufactured goods in Maryland	6 426		
United States [3]	2013	Texas water projects		2 000	
Total economic sector(s)-specific			8 243	263 000	271 243
Ministry-specific					

Cont.

44. The potential effect of possibly discriminatory GP is growing. For example, the US alone has over 25 measures pending at the national level.

Table 14. Scale of potentially affected government procurement (*cont.*)

Country	Year	Description	Annual	Multi-year	Total
Argentina [1]	2012	Fuel purchases from state owned oil company	n.a.		
Argentina [2]	2012	Official air travel with state owned airline	n.a.		
India [2]	2011	Railway safety technology		6 402	
Indonesia [2]	2012	Defence to be 85% LC by 2018		6 480	
Nigeria	2009	Defence clothing and uniforms	7		
United States [4]	2010	Jobs bill of 2010, iron and steel, manufactures		42 000	
United States [5]	2010	Small arms purchases in 2010	1 350		
United States [6]	2013	US Olympic Committee's uniforms	1		
United States [7]	2013	Buy America provision in EPA appropriations	2 356		
Total ministry specific			3 714	54 882	58 596
Total			**89 297**	**334 017**	**423 314**

[1] This figure relates only to the procurement included within the American Recovery and Reinvestment Act, which was introduced as a stimulus package related to the crisis. If we consider potentially discriminatory policies more broadly, implemented since 2008, the estimate of affected US government procurement in this table could double.

Source: Author's calculations based on publically available statistics, the detail of which can be found in Annex E.

The distortionary effects of these 22 GP measures will depend on the structure of the affected markets and the policies related to market entry in each of the implementing countries. Where they do have an effect, the measures are likely to boost domestic production, harm trade flows, and increase domestic prices. The scale of these effects can be mitigated as a result of the applicability of the GPA, the foreign share of the domestic GP market, and the procurement authority of the different levels of Government.

3.4.2 Localisation of data

There is little doubt of the importance of the Internet to the conduct of world business today.[45] It not only acts as vital infrastructure for much of the world's economy but the Internet is a multibillion dollar industry in its own right. Cloud services and mobile Internet are enabling "everything/everywhere" data access, thus paving the way for an ever-increasing variety of new services and applications. Indeed, this expansion has played a vital role in the growth of services, particularly services trade. Information and Communication Technology (ICT) services are growing faster than ICT goods, reaching output growth of between 5% to 10% in 2012 across the OECD (OECD, 2012). Employment in the sector has grown as well with top firms hiring more than 14 million people worldwide in 2011, a 6% increase over 2010 (OECD, 2012). In addition, the Internet has made a substantial contribution to labour productivity, contributing as much as half the average annual growth rate in labour productivity across the OECD (OECD, 2013b).

The digitation of information has created vast new opportunities for increased trade and investment. Today, roughly half of cross-border trade in services are ICT-enabled (UNCTAD 2012). The ICT sector itself accounts for an increasing share of total business revenue around the world, attracting more than half of all venture capital in the United States in 2011 (OECD 2012). Cross border data flows have been a driving force in the emergence of GVCs while SMEs are participating in international commerce at an increasing rate, thanks to Internet access (OECD, 2013b; Lendle et al., 2012).

45. McKinsey Global Institute (2011) estimated that in the period 2005-2010, the Internet contributed more than 10% to GDP growth in Canada, France, Germany, Italy, Japan, Korea, Sweden, the United Kingdom, and the United States, and more than 20% to the growth of GDP in Brazil, China, India and the Russian Federation.

The Internet economy is forecasted to grow at an annual rate of 8% over the next five years among the developed nations of the G20 while developing economies are expected to experience growth rates closer to 18%. Even companies that do not develop Internet products will benefit from this growth. Some estimates are that as much as 75% of the value created by Internet commerce accrues to non-developers, and these are not just OECD economies (Meltzer 2014). One study reports that online commerce accounts for a significant share of Latin American firms' trade, with the majority of companies participating in e-commerce experiencing revenue growth of more than 25% between 2011 and 2012 (Hunton and Williams, 2014).[46] Overall the Internet economy is expected to more than double for G20 economies between 2010 and 2016 and to employ an additional 32 million people (BCG, 2012).

Internet technologies have also transformed how many of the goods and services in the economy are produced and delivered. Digital sales make up more than half of music industry revenue; the share of digital sales for games, videos, and books are smaller, but growing quickly. For example, the US exports of digitally enabled services grew from USD282 billion in 2007 to USD 356 billion in 2011 (US ITC, 2013).[47] The Internet is also used increasingly in the movement of resources across the globe, revolutionising how start-ups are funded and staffed.

Business relies on data flows to meet a number of corporate needs.[48] In 2003, fewer than four out of every ten businesses had broadband access across the EU15. By the end of 2009 that had increased to nine out of ten and by 2011, business utilisation rates in the OECD ranged from 99% in Korea to 78% in Poland (Figure 5). Access to the Internet can reduce the effects of distance on developing economies by 65% lowering the costs of finding customers and accessing overseas markets. Reductions in frictions and other "offline" costs led to a 29% increase in average welfare across a range of developing economies (Lendle et al., 2012).

Digitizing information is seen as a way to stimulate growth and productivity across economies (OECD, 2012). The McKinsey Global Institute estimates that transborder online traffic grew 18-fold between 2005 and 2012 and that the global flow of goods, services, and investments – which reached USD 26 trillion in 2012 – could more than triple by 2025. Cisco forecasts that between 2013 and 2022, the so-called Internet of Things will generate USD 14.4 trillion in value for global enterprises (Cisco, 2014). Exports of cloud computing services were estimated to be worth approximately USD 1.5 billion in 2010 and the market for cloud computing services is anticipated to grow by up to 600% by 2015 (Meltzer, 2013).

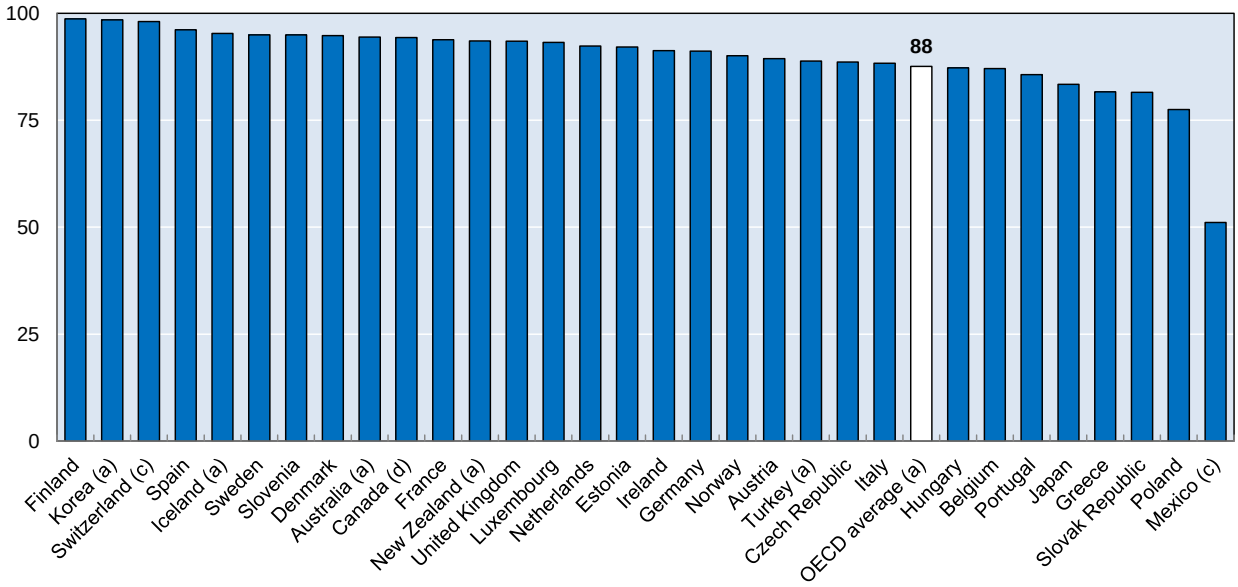
46. Based on a survey of more than 400 firms across the region.

47. "Digitally-enabled" has been defined by the US ITC as a sector, good or service for which digital information and communications technologies, including the Internet, play an important role in facilitating the design, development, production, marketing and delivery of products or services (US ITC, 2013).

48. See NBT (2014) for detailed examples of how data transfers support the conduct of everyday business activities.

Figure 5. Business use of broadband, 2011 or latest available year

Percentage of businesses with 10 or more employees



Source: OECD, ICT database and Eurostat, Community Survey on ICT usage in enterprises, June 2012.

Potential impacts of localisation barriers for data

Even as the use and generation of data is expanding at unprecedented rates, efforts to control or otherwise restrict these flows are growing. The list of measures put in place since the GFC and are in-force as of April 2014, are shown in Table 15.[49] Efforts to control data generally stem from two, but often overlapping, sets of policies: those requiring local storage and processing and those relating to the movement of personal data (NBT, 2014). Policies that require local storage also almost certainly require domestic traffic routing. This has the ability to undercut the interoperability on which the Internet depends (Woodcock, 2013).

Nine measures that are currently in-force and were implemented after the crisis have been identified through the sources listed in Section 1.2, and are presented in Table 15. The motivations behind these policies are numerous, but are often characterised as concerns for privacy or security. The argument is that if data is stored locally it will be more secure and governments will be in a better position to enforce privacy regulations. However, policies associated with forced localisation, the subject of this study, can lead to inefficient outcomes. The line between legitimate privacy and security concerns and those intended to create or promote domestic industry is often blurred. Requirements mandating foreign enterprises establish a data centre within a country as a condition for providing certain digital services is an example of such ambiguity. While there are legitimate policy concerns associated with cross-border data flows, there is a growing sense of danger in the business community that these measures are being put in place without a proper analysis of their trade-inhibiting effects and with little guarantee that privacy concerns will be addressed.

49. NBT (2014) cites a number of countries, both developed and developing who are considering or have already implemented requirements to either store data locally or use only local data servers.

Localisation policies fuel growing industry concerns over the potential "fragmentation" of the Internet (Goldenstein, 2014). Internet information is routed across the network through decisions made autonomously and automatically at local routers which choose paths based largely on efficiency and not national boundaries. Cloud computing exemplifies this process, making largely invisible to users the physical locations for the storage and processing of their data. Data localisation would dramatically alter this fundamental architecture of the Internet. Requiring businesses to establish local servers in every jurisdiction in which it operates greatly increases cost and other burdens for both providers and consumers.

All business models are based on data transfers. The restrictions of such transfers affect firms' ability to adopt the most efficient technologies (e.g. cloud computing), influence investment decisions, increase the cost of innovation and leads to missed business opportunities. Barriers to the movement of personal data make it harder for companies to identify customers. This can affect the ability to work with third-party suppliers, especially in the conduct of R&D. It can thus lead to delays in product development which can be very costly with rapid product cycles. Where possible, many companies have responded to restrictions by moving people to data, as opposed to the other way around, a very costly work-around.[50]

Compliance costs – including administrative costs (new routines and processes) and operational costs (local storage) – can be a large burden to companies, especially SMEs. These costs include the time needed to understand and put in place the myriad rules and regulations across markets. It also increases the time and complexity around contract negotiations, particularly for outsourcing. The Ponemon Institute surveyed 46 multinational corporations on compliance costs and found that data-related costs average over USD 1 million per year and were reported to be as high as USD 3.8 million (Ponemon, 2011). Other studies have found that compliance costs for non-ICT SMEs can increase their entire IT expenditures by as much as 40% (NBT, 2014).

While concerns over privacy or security are the most common reasons for implementing localisation barriers, in some cases, the desired outcome is the development of a domestic industry and the promotion of technology jobs. However, as demonstrated above, localisation policies rarely achieve these objectives. Data centres employ few workers with energy making up the majority of their operating costs. Also, data centres are expensive and usually built with imported foreign capital. These costs are even more burdensome if the centres are expected to have the highest levels of security. Building a data centre in Brazil costs USD 60.9 million on average while one in Chile costs USD 51.2 million and in the United States USD 43 million (Chao and Trevisani, 2013). Restricting exchange of traffic can establish bottlenecks, leading to double taxation and reduced competition (OECD, 2014). Local data exchanges undermine the countries' ability to engage in Internet network outside their local market over the long run.

50. The potential scale of these work-arounds could be large. For example, the EU recognises only 11 countries, representing only about 6% of global services trade, as having adequate data protection measures in place (NBT, 2014).

Table 15. Currently in-force data localisation measures

Country	Year	Description
Australia	2012	Section 77 of the Personally Controlled Electronic Health Record bill, proposed in the Australian Parliament, would require local data centres to handle personal e-health records. No electronic health information could be held or processed outside of Australia. The Australian Delegation to the OECD notes that: Australia's Personally Controlled Electronic Health Records (PCEHR) system was launched on 1 July 2012. While the legislative framework for this system prohibits registered operators and service providers to hold, process or take eHealth records offshore, it does not stop consumers or healthcare provider organisations from accessing the PCEHR system outside Australia. The legislative framework also allows de-identified information to be handled outside Australia for operational or administrative purposes. This exception allows, for example, offshore programmers to work on system software, if required.
Canada	2012	British Columbia's amendments to the Freedom of Information and Protection Of Privacy Act require that personal information collected by public sector agencies in Canada must be stored or accessed only in Canada, and the service provider must report any foreign demands for data disclosure.
Canada	2012	Nova Scotia's and British Columbia's amendments to the Personal Information International Disclosure Act require that personal information collected in Canada must be stored or accessed only in Canada, but a public body may override the rules where storage or access outside of the respective province is essential.
France	2011	The draft decree amending an article of the Code of Electronic Communications related to lawful interceptions includes a "territorial" restriction requiring that the systems for interception of electronic communications must be established in France, and encrypted with state-approved technology if data is transmitted outside the jurisdiction. Only employees entrusted by the state have access to the systems required for interception and the data produced by these systems. When technical obstacles warrant, derogations from the draft's restrictions can be granted on agreement with the State. *The French Delegation to the OECD notes that this measure has been implemented to meet National Security objectives.*
Greece	2011	Article 6 of Greek law no. 3917/2011 establishes a data residency requirement
Indonesia	2011	Article 25 of Indonesia's Undang-undang Informasi dan Transaksi Elektronik states that, "Any provider of Electronic System for public services that operates data centre must place the data centre and disaster recovery centre operations in Indonesia." In 2011 the Ministry of Communications (KOMINFO) required Research in Motion and Google to build server and data centers inside the country and is also approaching other companies like Visa and Mastercard with similar requests.
Kazakhstan	2011	In 2011, Google was notified of an order issued by Kazakhstan's Ministry of Communications and information that required all .kz domain names to operate on physical servers within the country's borders. Within a week of Google's protest, the government stated that the order no longer applies to previously registered domains (e.g. google.kz).
Chinese Taipei	2011	In Chinese Taipei, The Financial Supervisory Commission (FSC) has promulgated regulations to have most consumer financial institutional data moved and processed "on-shore". The FSC has since received authorization to enforce the regulation, which calls for financial institutions to comply within four years. In addition, the FSC has established more stringent rules in order for financial institutions to process/move data off-shore.
Viet Nam	2013	Starting 1 September 2013, Viet Nam's Decree 72 implements localization requirements mandating that all Internet service companies, such as Google or Facebook, operate at least one data centre in Viet Nam

Source: Annex A.

Trade policy environment in regard to data

There are no specific multilateral agreements or standards when it comes to data flows. The WTO has a number of agreements which deal with different aspects of data flows, but no universal rules. Indeed, trade rules have yet to adequately develop commitments that directly address the issue of cross-border data flows. Where there are agreements, they are usually limited to the context of e-commerce.

E-commerce is generally thought of as data flows associated with transactions conducted over the Internet. The WTO treatment of e-commerce encompasses elements of location, channel (i.e. the mode of transfer), market entity (good or service) and transaction (including supporting advertising and delivery) (OECD 2012). However, an inability to reach consensus on the extent of coverage of e-commerce by existing agreements within the WTO is a major stumbling block for the development of new trade rules or the determination of the applicability of existing ones for the governance of e-commerce. The lack of consensus on e-commerce by no means reflects inaction on the part of the WTO. Members have been discussing e-commerce since 1998, guided by the WTO Work Programme on Electronic Commerce (WPEC). The breadth of the WPEC highlights the importance of e-commerce within a spectrum of areas in the WTO system. At the most recent Ministerial (November 2013), members agreed to extend the current practice of not imposing duties on electronic transmission (at least until the next meeting to be held in 2015).

A significant obstacle to making progress toward a multilateral agreement on data flows is definitional. WTO members have been unable to reach a common understanding on whether digital products, specifically those products such as software, music, films, etc., which can be either downloaded or traded in physical form, are goods or services, and thus are covered by GATT or GATS. The classification problem extends beyond the technical need for a working definition. Commitments differ under each agreement and thus the impact of deciding the degree to which each agreement applies is fundamental. Classifying digital products under GATT rules automatically extends national treatment while in the GATS, national treatment is a negotiated commitment.

Some issues related to data transfers are dealt with in the WTO's Understanding on Commitments in Financial Services. This agreement includes a provision that members will not "prevent transfers of information or the processing of financial information, including transfers of data by electronic means." However, commitments under this agreement must be reconciled with the right of a WTO member to protect personal data and personal privacy so long as such support does not undermine the use of the Internet as a platform for international trade. Making progress on this front requires an agreement on what is an acceptable objective that would justify Internet restrictions.

Another important agreement that relates to data flows is the Information Technology Agreement (ITA). The ITA has endeavoured to remove trade barriers on equipment associated with ICT since 1996 and currently covers more than 250 products equivalent to about 97% of trade in technology products. However, the ITA is often viewed as out of date, thus limiting its ability to act as an instrument to ensure transparent and relevant rules regarding issues like data transfers. A recent study showed substantial benefits of an expanded ITA, especially in the area of conformity assessment requirements. This study found that an expansion of the ITA would increase exports EUR 13 billion in the EU alone (Thelle, Sunesen and Jensen, 2010).

Finally, in an annex to the GATS agreement, WTO members committed to ensuring reasonable and non-discriminatory access to basic public telecommunications networks and services. By 2013, 111 of the 158 WTO members had made commitments to facilitate trade in telecommunications services with 102 members committing to extend competition in basic voice telephony services. In addition, 90 WTO members have committed to the regulatory principles

spelled out in the "Reference Paper", that largely reflect "best practice" in telecoms regulation.[51] According to the Reference Paper, WTO member countries that adopt it, commit to requiring major suppliers to interconnect other suppliers at any technically feasible point on a non-discriminatory, cost-oriented basis following transparent procedures and subject to dispute settlement by an independent body (See OECD 2014 for more details).

On a more voluntary basis, the OECD has done a great deal of work to foster a consensus on the movement of data and internet policy more generally. In 2013 the OECD adopted revised privacy guidelines, which include an updated section on transborder data flow restrictions (OECD 2013f). These guidelines include a provision stating that restrictions on data flows should be proportionate to the risks presented but taking into account the sensitivity of the data, the purpose and context for processing. The Guidelines state that additional measures necessary for the protection of privacy and individual liberties, which may impact transborder flows of personal data, should be implemented in a manner that least impacts the free flow of personal data. Finally there are provisions in the OECD Recommendation on Principles for Internet Policy, which calls on members to "promote and protect the global free flow of information" and to "promote and enable cross-border delivery of services" (OECD 2011c).

Regional trade agreements and data

A growing number of RTAs now include reference and specific chapters covering e-commerce.[52] Membership of these RTAs is diverse and includes OECD and non-OECD countries. In many cases, countries have adopted e-commerce undertakings that go beyond those undertaken at the WTO, addressing issues related to definitions, application of WTO rules, non-discrimination, transparency, moratorium on customs duties on e-commerce transactions, as well as dealing with domestic regulation such as regulatory barriers, electronic authentication, consumer protection and more (Herman, 2010).

Korea's RTAs with the United States and the European Union are considered to be the most advanced in the area of e-commerce. While the original provisions were considered on the limited side, the Korea-US FTA has been upgraded to allow financial institutions to transfer information across borders for data processing where such processing is required in the ordinary course of business. These commitments, however, are limited to the financial sector. This agreement does take a step in the direction of broader commitments by including a provision that parties will "endeavour to refrain from imposing or maintaining unnecessary barriers to electronic information flows across borders" (Herman, 2010). However, the non-binding nature of this commitment limits its effectiveness. The EU-Korea RTA simply establishes a specialised committee for cooperation, implementation and supervision of the provisions related to e-commerce in the agreement.

Measuring digital trade: no data on data

Measuring the value of digital trade is difficult. This is due not just to a lack of basic statistical information, but also to the difficulties inherent in measuring the intangible benefits (and risks) of operating on the Internet. The benefits of digital trade can be grouped into six broad categories: (1) increases in output and employment; (2) increases in consumer welfare by reducing prices and increasing choice; (3) improved efficiency in access to imports and exports, especially services; (4) improved coordination of GVCs, especially for SMEs; (5) promotion of

51 . More information about telecommunication commitments under the WTO, including a link to the reference paper, can be found here http://www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_e.htm.

52. The OECD report on RTAs and E-Commerce (Herman 2010) provides an in-depth discussion of the treatment of e-commerce in RTAs.

innovation and increase labour productivity and (6) increased efficiency and sales. It is difficult to estimate the size of the economic impacts because it is nearly impossible to account for the entire market effects of the Internet and digital trade (US ITC, 2013). Simply adding up the relevant sales or employment numbers from firms identifying themselves as participating does not capture what activities are enabled versus what are actually conducted via the Internet. It also does not consider the benefits of improved resource allocation. Resource efficiency is not only enhanced by improved information on employment and investment opportunities but by the new market opportunities such as Internet-supported services trade and crowd-funding of business ventures.

On the other hand, it is important to account for the economic losses associated with the expanded role of the Internet. For example, while the use of digital media has exploded, newspaper publishing employment in the United States fell 40% between 2001 and 2011 and the industry ranks No 5 in terms of the 'fastest dying' (IBTimes, 2012). There are also increases in risks to individuals due to fraudulent financial schemes and business opportunities on the Internet. From the business perspective, the cost of data breach has increased every year since 2006. One study estimates that the average organizational cost of a data breach in 2010 increased to USD 7.2 million, up 7% from USD 6.8 million in 2009 (Ponemon, 2011). Data breaches in 2010 cost companies an average of USD 214 per compromised record, up from USD 10 in 2009 (Ponemon, 2011). These increased operating costs should be considered when measuring the value of data to the economy.[53]

Studies that have attempted to quantify the economic contributions of the Internet have generally found that it has made significant contributions to output, employment, consumer welfare, trade, innovation, productivity, and corporate financial performance (US ITC, 2013). Digital trade can help producers lower their operating costs and work more efficiently. SMEs especially benefit from having lower-cost access to a wider range of products, services, and markets. Consumers benefit by gaining greater access to information about products and prices and more convenient ways to shop.

In its recent *Internet Economy Outlook*, the OECD discussed a number of approaches to potentially measuring the value of the Internet economy, not just the value of trade. These included three general approaches: measuring its direct impact, its dynamic impact, and the indirect impact. The first relies on official data and can be thought of as an accounting approach where those parts of the economy identified as relating to the Internet are added up. A dynamic approach takes a broader perspective and considers the impact the Internet has on the profits and growth of all firms in the economy. The third approach is the broadest approach and studies the effect of the Internet as akin to a general welfare gain. This approach captures gains not generally reflected in traditional official statistics by including gains in consumer welfare. That is gains consumers receive from improvements in price comparison and being able to purchase at a price further below their willingness to pay than would have otherwise been possible.

3.5 Summary

This section has highlighted the important impact that industry-focused LCR policies have on existing, as well as potential, foreign content. Measures on existing foreign content were shown to be unambiguously bad for trade, decreasing import and export flows even in those economies not engaging in such actions. The estimates presented here indicate that more than USD 10 billion worth of imports are lost due to only 12 displacement LCRs measured. The size of the impact is directly related to the amount of foreign competition displaced by the measure. For many of the LCRs covered in this report, displacement was not large and thus impacts were relatively small. The exceptions to this were the LCRs placed on the motor vehicle sector. These

53. Of course one needs to acknowledge that the industry associated with the tracking and protection of data is a generator of jobs also (see, for example Perlroth, 2014)

lead to significant domestic disruption as well as to trade divergence in other trading nations, affecting both directly displaced exporting economies as well as those not operating in, but competing with, the LCR imposing economy.

The analysis has shown that governments have also used procurement preference policies, with over a third of the LCR measures implemented since the crisis targeting GP. The potential GP market affected by those measures that are currently-in-force and related to market access could be as high as USD 423 billion. The GP LCR measures examined continue a long history of governments using procurement to meet policy objectives beyond obtaining 'value-for-money.' The extent to which the LCR will have an impact will depend on the market structure of the specific sector and the relative size of GP in that sector. The scale of distortionary effects of the LCRs will be influenced by a number of factors, including whether the implementing country is a signatory to the WTO GPA, and the nature of their commitments under that agreement; the existing level of foreign contestability in GP markets; and the role of the different levels of government in procurement.

Provisions related to data residency are similarly complex and far reaching. The internet economy not only generates innovation and jobs, but it underpins the business model of most modern economies. However, the international regulatory environment has not kept pace with the sweeping changes brought about by the Internet. There are no reliable statistics that measure its size in economic activity. Further, its treatment in international trade agreements is piecemeal and inconsistent.

4. Policy alternatives

As discussed in Section 2, LCRs are implemented to meet a wide range of policy objectives covering industrial development, technological development, and employment. Whenever a policy attempts to link many objectives, there is the risk of misalignment between the objective and the policy instrument.[54] As noted in Tordo et al. (2013), the first best policy is one that removes the identified market failure most efficiently. Policies with effects beyond the removal of the market failure should be considered, if at all, as a second-best option.

Government intervention whether it be for industrial, technological or employment development falls under the general heading of industrial policy. Pack and Saggi (2006) define industrial policy as

> *… any type of selective intervention or government policy that attempts to alter the sectoral structure of production toward sectors that are expected to offer better prospects for economic growth than would occur in the absence of such intervention.*[55]

Most countries at some point in their history have made use of some form of industrial policy. More recently, and in response to the GFC, governments have increasingly turned towards these sorts of policies as they search for new sources of growth and employment creation (Warwick, 2013). The merits and faults of these policies have long been debated. Harrison and Rodriguez-Clare (2009) review a range of experiences across countries and over time, as industrial policies evolved. While they conclude that the evidence related to industrial policy is inconclusive, they do differentiate between the costs and benefits of "hard" versus "soft" industrial policy.

54. The optimal number of policy instruments can be traced back to the seminal paper Brainard (1967) which discussed the decrease in effectiveness when one instrument is assigned multiple objectives.

55. They also note that policies aimed at improving the productivity of specific sectors or firms are a subsidiary of this policy area.

"Hard" industrial policy uses measures to distort prices rather than address the underlying problems related to industrial development. There is little evidence to suggest that these policies will lead to long term growth or diversification in the economy (Harrison and Rodriguez-Clare, 2009). The measures commonly used in hard policy include tariffs, export subsidies, tax breaks for foreign companies, and local content requirements.

In contrast, "soft" industrial policy attempts to address the problems that keep productivity low in existing sectors or create the barriers to developing new economic sectors. The goal of soft industrial policy is to develop a process where industry, government, and other private organisations work together to set strategic priorities, resolve coordination problems, experiment with potential interventions, minimise the impact of vested interests, and improve productivity (Harrison and Rodriguez-Clare, 2009; Warwick, 2013). An exhaustive range of potential measures within soft industry policy is difficult to compile, as the measures should be designed on a case-by-case basis as part of the collaboration between government, industry, and other private organisations. The key factor is that the measure is directed at resolving the barrier to development, and not at distorting prices.

Alternative policy suggestions developed in this report fall under the heading of soft industrial policies. These policies are able to meet the same objectives as those envisaged by the LCRs, namely industrial development, technological development, and employment but in a less distortive manner. These alternative suggestions tend to be complementary to trade policies. Following the typology set out in Warwick (2013), alternative policies are differentiated between horizontal and selective policies. Horizontal policies aim to improve the "framework conditions" or general business environment in the economy. Selective policies tend to be those targeted at a specific sector, technology, or task depending on the nature of the barrier that has been identified. It could focus on an economic sector, or a technology that is necessary across multiple sectors, or a specific task within a supply chain.

4.1 Horizontal policies

The role of horizontal policies is to provide the best possible environment for the economy to expand along its existing areas of comparative advantage. As such, it avoids providing targeted measures towards specific sectors of the economy. This section provides examples of alternative policies with objectives similar to the LCRs. It draws on a significant body of existing policy advice in this area, including the OECD (Warwick, 2013), and also recent work from APEC (2013).

4.1.1 Business and regulatory environment

The business and regulatory environment determines the ease with which firms can operate in an economy. Making it easier to work in an economy increases the chances that firms will invest and grow, leading to more jobs and higher levels of local production. Nicoletti and Scarpetto (2003) found that productivity growth is boosted by reforms that promote private corporate governance and competition. In in addition they found that entry-limiting regulation may hinder the adoption of technologies, possibly by reducing competitive pressures, technology spillovers, or the entry of new high-tech firms. Reforms in this area should focus on applying best practice and removal of unnecessary regulation. Areas of focus can include competition and anti-trust policy, product market regulation, investment protection, enforcement of property rights, and processes to start and close a business.

Policies of this nature have the potential to significantly affect those countries that have implemented LCRs targeted at inputs (as opposed to measures targeted at investment, labour, or data). Table 16 below shows the performance of the implementing countries in the World Bank's Ease of Doing Business rankings, by quartile. This table shows the potential for the implementing countries to benefit from business and regulatory reform. Djankov et al. (2006) make use of the

World Bank's Ease of Doing Business rankings to show that economies with better regulations grow faster. They find that improving from the bottom to the top quartile of countries could improve annual economic growth by 2.3 percentage points.

Table 16. Ease of doing business quartiles

Doing business rank (quartile)	Number of countries	Cumulative percentage
First quartile	6	26.09
Second quartile	7	56.52
Third quartile	7	86.96
Fourth quartile	3	100.00
Total implementing countries	23	
Total number of countries ranked	189	

Source: World Bank Doing Business Database (2013).

4.1.2 Productivity growth

One of the expectations of policy makers is that an LCR could either induce, or mandate, foreign companies to transfer foreign technology to the domestic market. The literature discussed in Section 2 suggested that it was possible for the technology gap to be too great for a foreign firm to be willing to install their technology or the skill base too low to adequately adopt it (Veloso, 2001). A better approach is to examine why the technology gap exits. There are a wide range of factors that can influence a country's ability to innovate or why technology gaps exist. These factors include its economic structure, firm demography (e.g. number of SMEs), geography and resource endowment, infrastructure, stage of socioeconomic development, general framework conditions (e.g. macroeconomic conditions, regulatory policies and markets) and institutional environment (OECD, 2010).

One way governments can reduce its technology gap is to encourage the use of foreign intermediate imports that have a higher level of technology embedded in their production the opposite of an LCR policy. Their use can be encouraged by reducing trade barriers (tariffs, non-tariff barriers), particularly on intermediate inputs. Additionally, governments can support domestic research and development through tax credits and establishing centres of excellence that integrate academics, the private sector, and government. Thirdly, governments can strengthen their Intellectual Property Rights (IPR) regime. A strong regime provides incentives for domestic research, and provides confidence to foreign firms looking to invest. Park and Lippoldt (2008) show that strengthened IPRs can actually stimulate technology transfer, particularly the transfer of technology-intensive goods, services and capital, as well as stimulating local innovation.

Table 17 shows that most of the countries that have implemented content focused LCRs have a low level of technological readiness. Based on the World Economic Forum's (WEF) Global Competitiveness Index, just over 60% of the implementing countries were ranked outside the most competitive 40 countries in terms of their technological readiness. This suggests that there is room for enacting policies to improve technological transfer and development.

An inability to source relevantly skilled labour increases the challenges to operating and expanding for business. A policy that is focused on developing the necessary skills domestically will enhance labour productivity and enhance economic growth. Hanushek and Woessmann (2008) draw on the OECD's Programme for International Student Assessment (PISA) test scores to estimate the effect of improved cognitive skills on economic growth. They find that, amongst OECD countries, an increase of one standard deviation on test scores would increase the annual growth rate by 1.74 percentage points. To support skill development governments can invest in basic education and set up specialised training centres which can also work in partnership with

the private sector. However, identifying the gaps between the current demand and supply of skills is important before a specific programme can be implemented.

Table 17. Technological readiness and capacity for innovation

Global competitiveness rank	Technological readiness		Capacity for innovation	
	Number of countries	Cumulative percentage	Number of countries	Cumulative percentage
Top 20	4	17.39	4	17.39
Between 20th and 40th	1	21.74	6	43.48
Between 40th and 60th	6	47.83	4	60.87
Between 60th and 80th	3	60.87	2	69.57
Between 80th and 100th	6	86.96	2	78.26
Greater than 100th	3	100.00	5	100.00
Total implementing countries	23		23	
Total number of countries ranked	148		148	

Source: World Economic Forum, Global Competitiveness Index (2013).

Table 18 indicates the quality of education and the level of on-the-job training provided by the countries that have implemented content focused LCRs since the onset of the financial crisis. For both Global Competitiveness Index indicators, around 60% of the countries are ranked outside the top 60 economies. This suggests that policies that specifically target skill levels through improving education quality and professional training could deliver benefits, which could improve productivity.

Table 18. Quality of education and on-the-job training indicators

Global competitiveness rank	Quality of education		On-the-job training	
	Number of countries	Cumulative percentage	Number of countries	Cumulative percentage
Top 20	1	4.35	3	13.04
Between 20th and 40th	4	21.74	5	34.78
Between 40th and 60th	4	39.13	2	43.48
Between 60th and 80th	6	65.22	3	56.52
Between 80th and 100th	3	78.26	5	78.26
Greater than 100th	5	100.00	5	100.00
Total implementing countries	23		23	
Total number of countries ranked	148		148	

Source: World Economic Forum, Global Competitiveness Index (2013).

4.1.4 Investment in infrastructure

Increasing the level and quality of infrastructure in an economy reduces the economic distance between economic centres within a country, as well as between countries. This reduced distance opens the possibility of a greater number of production networks and associated investment, allows for greater specialisation, and increases the chances of agglomeration benefits to accrue. Infrastructure investment incorporating both “hard” infrastructure (roads, rail, air and sea ports) as well as “soft” infrastructure (ICT infrastructure, customs procedures) helps attract investors to grow domestic production and employment. The World Bank notes that the estimates for the impact of infrastructure on economic growth vary. A mid-point estimate of recent studies

indicates that a doubling in the level of infrastructure could increase GDP by 10% (World Bank, 2010).

The WEF, as part of its Global Competitiveness Index, annually reviews and ranks the level of Transport and ICT infrastructure across 148 countries. Their results show that the implementing countries have relatively stronger transport infrastructure than ICT infrastructure. Nearly half of the implementing countries were ranked outside the top 80 countries for ICT infrastructure, while only 30% were in that position for transport infrastructure. Lendle et al. (2012) show that the average gain in real income across 56 countries due to a reduction in information frictions (defined as a reduction in information asymmetries across online platforms) is 29%.

Table 19. Infrastructure indicators

Global competitiveness rank	Transport infrastructure		Electricity and telephony infrastructure	
	Number of countries	Cumulative percentage	Number of countries	Cumulative percentage
Top 20	5	21.74	3	13.04
Between 20th and 40th	5	43.48	4	30.43
Between 40th and 60th	2	52.17	4	47.83
Between 60th and 80th	4	69.57	1	52.17
Between 80th and 100th	3	82.61	7	82.61
Greater than 100th	4	100.00	4	100.00
Total implementing countries	23		23	
Total Number of countries ranked	148		148	

Source: World Economic Forum, Global Competitiveness Index (2013).

Some LCRs are implemented with the intention of developing internationally competitive industries. Using LCRs to meet this objective seems to be the antithesis of recent work, led by the OECD, characterising the rise of Global Value Chains (GVCs) and the role trade plays in their development. The OECD has provided policy advice on how to best engage in GVCs, which fall within the realm of horizontal industrial policy. These polices are outlined in Box 2.

4.1.5 Investment in institutions

The importance of institutions for growth and development is well documented in economic literature. Effective institutions can promote inclusive and integrated markets, and have the power to provide stable growth (World Bank, 2002). Institutions also play a role in determining regulation in an economy. North (1990) suggests that the processes and outcomes of a regulatory regime are determined by the institutional context within an economy, which is reflected in both the formal and informal rules of making economic transactions.

More precisely, economic institutions are directly tied to growth because they directly influence the behaviour of economic actors in addition to where and to what extent investments are made in physical and human capital, what technology is employed and developed and how production is organised. And there is convincing empirical support that countries with better economic institutions have higher per-capita incomes (Acemoglu et al., 2006). For example, Knack and Keefer (1995) find that countries with more secure property rights have higher

average incomes.[56] Thus investing in institutional integrity in general will support many of the policy objectives underlying LCR measures.

Box 2. Policies to develop global value chains

The advent of global value chains (GVCs), and their highly dynamic nature, may limit the ability of policy makers to implement a targeted measure in an appropriate timeframe, particularly in those manufacturing sectors with strong GVCs. As noted by Pack and Saggi (2006):

> In a world of international production networks, very fast innovation with dramatic declines in product prices, rapidly changing product characteristics, new products that quickly lead to the obsolescence of older ones, and the premium on the ability to rapidly communicate electronically, it may be beyond the competence of any government to help their domestic firms foresee and successfully deal with more than a small fraction of the unknowable changes that will affect their future trajectory. (page 44)

The OECD is at the forefront of policy advice for governments looking to support firms' participation in GVCs (OECD, 2013d). The advice is horizontal in nature and does not require sectors or tasks to be selected. The policy advice to increase engagement in GVCs includes the following:

- Reduce trade barriers including tariffs, non-tariff barriers, and enhance border processes and customs practices.
- Reduce barriers to investment to encourage investments by lead (MNEs) firms.
- Develop high quality infrastructure. This should include: transport infrastructure with major international gateways and corridor infrastructures; ICT infrastructure to reduce communications costs; and "soft" infrastructure such as the institutional framework within an economy.
- Policies to facilitate the development of services sectors, which can act as the glue between a country's infrastructure and the activities of its firms in GVCs
- Develop the supply capacity of domestic firms (often SMEs). Initiatives to increase links between local firms and international supply-chain partners can facilitate capacity building. As can the provision of information and building activities, training facilities and courses for local firms.

4.2 Selective policies

Selective policies are intended to resolve a specific barrier relevant to a specific section of the economy. The targets of these selective policies can involve overlapping sectors, technologies, supply chains or the tasks and activities that make up supply chains (Baldwin and Evenett, 2012). To be successful, policymakers need to identify the market failure in the specific sector, and then develop the precise measure that will resolve the failure as efficiently as possible.

The use of selective policies has been particularly contentious in the past. There are two common practical objections to selective industrial policies (Rodrik, 2008). Both of these objections need to be addressed before governments consider implementing any selective policies. First, some consider the barrier of acquiring the necessary information to be insurmountable. Table 20 lists some of the information that policymakers need before they can select, design, and implement a measure (Pack and Saggi, 2006). These information demands make it difficult for policymakers to know which industries or sectors to target. In addition, sourcing this information is a challenge as it is likely to be held by firms or other private organisations. Finally, where positive externalities are expected, it is hard to estimate their scale, which is necessary to determine the scale of the intervention.

56. Subsequent studies using similar approaches (such as Hall and Jones (1999) and Acemoglu et al. (2002)) find property rights to be a robust proxy for economic institutions.

Table 20. Non-exhaustive list of information barriers to selective industrial policy

Information requirement
Whether consumers learn the quality of a good only after consuming rather than inspecting it
Whether firms that are trying to reduce production costs also begin a simultaneous effort to improve their product's quality to obtain a better reputation
Which firms and industries generate knowledge spillovers
Which firms and industries benefit from dynamic scale economies – what is the precise path of such learning and the magnitude of the cost disadvantage at each stage of the learning process
Which sectors have a long-term comparative advantage
Knowledge of the size of scale economies of different firms and sectors in order to facilitate investment coordination
The potential effects of FDI or international trade in solving some of the coordination problems, including a detailed knowledge of which of tens of thousands of intermediates are tradable
A better sense than individual firms possess about their potential competitiveness
The nature and extent of capital market failures
The magnitude and direction of inter-industry spillovers
The relative amount of learning by individual firms from others and from their own experience
The extent to which early entrants generate benefits for future entrants
The extent of heterogeneity of firms' learning abilities
A forecast of which firms can create new knowledge and discover better production methods.
The spillover effects of FDI as well as the likely intensity of their purchase of domestic intermediates

Source: Pack and Saggi (2006).

The second common objection is that targeted measures attract corruption and rent-seeking behaviour from the affected parties. The opportunity could come from information asymmetries where firms hold more information than the government (Warwick, 2013), or simply because the incentive to receive government support lures firms into rent-seeking behaviour (Pack and Saggi, 2006; Rodrik, 2008). This falls under the concept of "regulatory capture", that suggests the regulatory process has a bias in favour of particular interests. Stigler (1971) and Peltzman (1976) argue that regulators are presumed to favour producer interests because of the concentration of regulatory benefits and diffusion of regulatory costs. Regulation is also subject to "political capture" where regulatory goals are distorted to pursue political ends (Laffont and Tirole, 1991). The state is made up of structures and individuals who sometimes pursue personal objectives in the name of the general interest. Under political capture, regulation becomes a tool of self-interest within government or the ruling elite (Posner, 1974 and Stiglitz, 1998). Strong institutions and processes are needed to overcome these obstacles.

4.2.1 Institutional development

A recent OECD Science, Technology, and Industry Policy Paper suggests government institutions and systems can be developed to resolve those two objectives (Warwick, 2013). The objective of these institutions is to fight systems failure while minimising the risk of government failure. Once in place, the institutions should allow the identification, design, implementation, and evaluation of measures intended to resolve a market failure.

A key aspect of these institutions is the recognition that the focus of the government should not be on "picking winners", but rather on strategic collaboration and coordination with the private sector (Rodrik, 2008). This collaboration is intended to identify the most significant barriers to sector development, design effective interventions, evaluate those interventions, and

then learn from the mistakes in the process. Rodrik (2008) acknowledges that policymakers have limited knowledge about the activities that deserve support, what measures are best to use, and the conditions they should put in place for the private sector. Thus it is best to design flexible policies with well specified objectives and timelines with automatic review processes.

As policy failure is possible the monitoring role of the government is vital as is a willingness to withdraw support when the policy fails to meet agreed targets. In this way the government can work to minimise the costs of the failed policy and make it easier to move onto other potential policies. To be successful, Rodrik argues that the institutions need to be embedded within society (i.e. civil society and the business community), have strong safeguards against bureaucratic capture, and have necessary accountability features.

The existence of significant information barriers requires mechanisms to obtain information about market failures from market participants. These mechanisms need to be 'embedded' within the market to enable close collaboration between the private sector and the government. Existing examples of this type of mechanism would include deliberation councils, supplier development forums, investment advisory councils, sectoral round-tables, private-public venture funds, or contests that allow private firms to bid for public resources.

Safeguards against corruption involve both incentives and punishments for the private sector. The incentives are clear: If a business collaborates and identifies a specific market failure, then the reward is a targeted measure that should remove the failure and allow the company to prosper. The threat of punishment takes the form of targets, sunsets, monitoring reviews, and evaluations that are agreed upon before the measure is implemented. If the policy fails to meet the agreed conditions during monitoring, then the policy is considered to have failed and is removed.

Public accountability for the performance of any measures will protect against bureaucratic capture. A transparent approach to both the discovery process, as well as the target-setting and evaluation process will allow the public to hold the government accountable for any outcomes that deviate from those targeted.

Developing institutions that enable the government and private sectors to work together in a discovery process could reduce the barriers to the information required to identify specific market failures and design specific policies to overcome them. The incentive of removing market barriers will encourage the private sector to participate with the government. Setting clear targets, monitoring and evaluation processes, and the threat of removal of the policy measure will reduce the risk of corruption or bureaucratic capture. Making the institution publically accountable will further reduce this risk of bureaucratic capture.

There will be costs associated with the founding and ongoing operation of these institutions. The expected costs should be weighed against the expected benefits of the institutions and selective policies before they are implemented. If the scale of the expected benefits of the selective policies is low, then the costs of the institutions may be prohibitive. In that case, only horizontal policies should be considered by the government in that economy.

4.2.2 Selective "soft" policy options

Once an appropriate institutional framework is established, and the collaborative mechanism identifies a market barrier, then the government could introduce a policy targeted to that specific barrier. The range of potential policies that the discovery process could design is potentially unlimited, as they are intended to be tailored on a case-by-case basis. This section discusses some possibilities of selective soft industrial policies aimed at the LCR objectives. As with all soft policy options, the key factor is that they are targeted at the barrier to development, and not in distorting prices.

An exhaustive range of potential measures within soft policy is difficult to compile, as the design of the measures should be designed on a case-by-case basis as part of the collaboration

between government, industry, and other private organisations. All of the horizontal policies have targeted equivalents, and Warwick (2013) has a typology that includes the following domains:

- Labour and skills: targeted skills policies, apprenticeships, training partnerships with foreign firms, overseas scholarships for skill gaps, long-term collaborative strategies for education and research between business associations and universities;
- Technology: clusters, R&D subsidies, grants for innovative projects proposed by local firms, prizes to innovative firms, grants for research projects proposed by local firms and carried out by local research institutions, long-term collaborative strategies for education and research between business associations and universities;
- Systems and institutions: Sectoral competitiveness strategies, cluster policies, and strategic planning with industry;
- Capital markets: govt. investment fund, access to financing, emergency loans, FDI promotion for specific sectors or technologies; and
- Land: infrastructure, zoning policy to enable clustering of firms in related lines of business

These then would work in harmony with the larger horizontal policy initiatives to achieve the stated objective. The two types of policies can complement each other, especially as they can be designed to work over different time horizons. Many of the horizontal initiatives discussed require upfront investment in capacity and institutions while the benefits accrue over the longer run. However, the more specific or soft policies can be designed to yield more immediate returns. The interaction of the two policy fronts can lead to both shorter term gains while building the underlying long run framework necessary for growth and development.

5. Conclusions

LCRs reduce world trade

Those trade-related LCRs measured have led to a fall in global welfare.[57] The impact of these measures on gross domestic product (GDP) and other macroeconomic outcomes is quite small, as is their impact on unemployment, a primary objective in most cases. Total imports and total exports decline in every modelled region as a result of these policies, even in those regions not implementing an LCR.[58] The decline in LCR imposing economies is net of the increased imports in non-targeted LCR and final demand sectors.

LCRs threaten to undercut the gains from integration and GVCs

Given that the vast majority of the trade-related LCRs examined are targeted at intermediate goods, the largest reduction in trade flows is in intermediates trade. The negative outcome for trade in intermediates is particularly alarming when considered in the context of Global Value Chains. Reducing trade in intermediates in particularly threatens to lower productivity and reduce connectivity across the globe.

57. The exception is the price preferences applied to the Brazilian communication sector which causes Brazilian welfare to rise, but welfare outside Brazil to fall.

58. Again, the sole exception to this is for the price preference measure implemented by Brazil. However, as discussed in the body of the report, this particular policy was, in effect, removing an existing distortion and thus led to (small) gains for the Brazilian economy.

LCRs have unintended consequences that are not in policymakers' interests

Imposing LCR raises domestic production costs to the industry targeted, which in turn increases prices. The increased prices are passed along to producers further along the production chain, reducing the competitiveness of industries across the economy. The efficiency losses in the market place are relative to the additional domestic inputs required under the LCR as well as the position of the targeted sector in the value chain. Targeting inputs further up creates a greater inefficiencies by increasing costs at more points along the production process.

The resulting loss in competitiveness leads to a substitution away from these now more expensive goods by the rest of the economy and across trading partners. While the LCR forces firms to buy intermediate inputs from domestic sources, households are under no such restrictions. As the LCR pushes up domestic production costs with households increasing their consumption of imports of the final good. In some instances this causes imports to actually increase in the presence of LCRs. This also leads to a reduction in production diversity across the economy.

In addition to households, other sectors substitute away from the domestic good. To avoid the increase in costs due to an LCR, non-targeted industries now increase purchases of the comparatively cheaper imports. In addition, suppliers to the targeted sector increase their share of imported inputs, again, often completely offsetting the original LCR.

Finally, there is evidence of price discrimination, where some firms increase exports in the presence of an LCR. As the LCR allows targeted sectors to increase their price to domestic producers, they are able to reduce their export price without sacrificing profitability. However, the net trade effect is determined by the degree to which all import and export markets are affected by changes in the country's exchange rate. These exchange rate effects often undercut the price discrimination mechanism, resulting in a decrease in total exports.

The effects of LCRs focused on government procurement and data localisation are complex and warrant further work

In general, GP LCRs reduce the number of firms eligible to enter markets, and the associated increase in market power could lead to lower output and employment while increasing the costs of GP. Other factors that determine the extent to which the LCR will have any impact include the market structure of the specific sector, the relative size of GP in that sector, whether the implementing country is a signatory to the WTO GPA and the nature of their commitments under that agreement, the existing level of foreign contestability in GP markets, and the role of the different levels of government in procurement.

Efforts to control data generally stem from two, but often overlapping, sets of policies: those requiring local storage and processing and those relating to security and the movement of personal data. Data protection and security regulations have implications on almost every sector of the economy given the reliance of today's business models on data transfers. The restrictions of such transfers affect firms' ability to adopt the most efficient technologies, influence investment decisions, increase the cost of innovation and lead to missed business opportunities.

Measuring the value of digital trade is difficult. This is due not just to a lack of basic statistical information, but also to the difficulties inherent in measuring the intangible benefits (and risks) of operating on the internet.

Alternative policies should focus on resolving market failure rather than distorting production and trade

Alternative policies to LCRs should be targeted at the barriers prohibiting the specific industrial development, technological development, or employment objectives for which the LCRs have been used. The barrier should be identified as part of a collaborative effort between

government, industry, and other private organisations. The key factor is that the measure is directed at resolving the barrier to development, and not at distorting prices.

Policies applied horizontally across the economy aim at providing the best possible environment to expand along existing areas of comparative and competitive advantage. These policies should be targeted at the business and regulatory environment, trade and investment barriers, innovation policy and infrastructure development.

More selective policies can be implemented, but governments need to address information barriers and rent-seeking behaviour before they are considered. Institutions can be developed that are embedded within the market to overcome the information barrier, while strong public accountability and transparency regimes mitigate the risk of corruption and rent-seeking behaviour. These institutions will come with a cost, and the expected benefits of any selective policies should be weighed against these costs.

A key aspect of these institutions will be a shift in focus from 'picking winners' to strategically working with the private sector to develop efficient policy interventions. There needs to be clear agreement that when those interventions fail to meet publically agreed targets, the policy is removed.

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Annex A

Full list of LCR measures

Annex Table A1. Full list of LCR measures in-force and implemented between 2008 and 1 April 2014[1 2]

Country	Year	Description	Benefit	Targeted market	Source
Algeria	2009	The law "La loi de finances complémentaire 2009" of 26 July 2009 introduced restrictions, such as 'Buy Algerian' requirement for all investors benefitting from assistance of Agence Nationale de Developpement des Investissements (ANDI) and a pre-emptive right of re-aquisition of shares sold by foreign investors by the State.	Govern-ment loans/fund s	Inputs	EC Tenth Report on Potentially Trade-Restrictive Measures
	2010	Presidential decree of 11 July 2010 on public procurement in Algeria reinforces preferences for domestic bidders in public procurement orders, in order to strengthen domestic participation. Accordingly, the preference margin for national bidders has been increased from 15% to 25%. In addition, the law imposes an obligation to resort to a domestic bidder if the national producer is able to satisfy the conditions of tender. Foreign bidders who win the bid will be obliged in the future to conclude contracts with a local producer. Non-respect of such a contract could result in sanctions. It was published in the Official Journal of Algeria on 7 October 2010. Furthermore, presidential decree of 1 March 2011 stipulates that foreign investors already present in Algeria or with significant engagement of investment may be exempted partially or completely from the obligation of investment as a precondition to participate in public bids.	Price preference	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
Argentina	2010	The Local-Investment Incentives Regime for Motorcycles and Motorcycle Parts Manufacturing (Secretaría de Industria, Resolución 11/2010) in Argentina conditions tax credits on locally produced input purchases. The reduction of duties on imported inputs is conditioned on the applicant's pledge to invest in the facilities, machinery, and/or business of local suppliers.	Tax break/ credit	Ownership / partner-ship	Peterson (2013)
	2011	The Argentine Superintendent of Insurance (SSN) has established a regulatory framework (SSN resolution no. 35.615/2011) that prohibits certain cross-border reinsurance operations. The new regulation means that local insurance firms can only lay off reinsurance risks to locally based Argentine reinsurers, or Argentine subsidiaries or branches of foreign companies	Market access	Inputs	Peterson (2013)
	2011	Law 25551 of 2011 established a national preference for local industry for most government procurement if the domestic supplier's tender, depending on the size of the company, is no more than 5% to 7% higher than the foreign tender. The preference applies to procurement by all government agencies, public utilities, and concessionaires. There is similar legislation at the provincial level. These preferences serve as barriers to participation by foreign firms.	Price preference	Govern-ment Procure-ment	USTR (2013)

Country	Year	Description	Benefit	Targeted market	Source
Argentina (cont.)	2012	Decree 1189/2012 - Established that fuel and lubricants for official cars, ships and planes have to be acquired from nationalized company YPF. (19.07.2012)	Market access	Government Procurement	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	Decree 1191/2012 - Established that - as long as the routes are covered by the public airlines Aerolineas Argentinas, Austral and Lade - public officials have to fly with these companies. (19.07.2012)	Market access	Government Procurement	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	As of February 2012, firms must submit a Declaración Jurada Anticipada de Importación for advance approval to import (Administración Federal de Ingresos Públicos General Resolution No. 3252 and 3255). Import approvals will take 3 to 18 days to process. To continue selling into the Argentine market, some foreign companies have set up assembly facilities within Argentina.	Market access	Ownership / partnership	Peterson (2013)
	2012	Resolution no. 12/2012 requires mining companies with operations in Argentina to use local transport companies for the shipment of products	Market access	Inputs	Peterson (2013)
Australia	2011	Prime Minister Julia Gillard announced a one-year extension of the AIP, expansion of the AIP to state and local governments, and a 5% import tariff tax credit law on federal and state projects of AUD 20 million or more that entail major procurement contracts with Australian companies.	Tax break/ credit	Government Procurement	Peterson (2013)
	2012	Section 77 of the Personally Controlled Electronic Health Record bill, proposed in the Australian Parliament, would require local data centers to handle personal e-health records. No electronic health information could be held or processed outside of Australia. The Australian Delegation to the OECD notes that: Australia's Personally Controlled Electronic Health Records (PCEHR) system was launched on 1 July 2012. While the legislative framework for this system prohibits registered operators and service providers to hold, process or take eHealth records offshore, it does not stop consumers or healthcare provider organisations from accessing the PCEHR system outside Australia. The legislative framework also allows de-identified information to be handled outside Australia for operational or administrative purposes. This exception allows, for example, offshore programmers to work on system software, if required.	Market access	Data residency	Peterson (2013)
	2012	In November 2011, Australia issued a media release "Government moves to ensure quality Australian content stays on Australian television," which outlines new regulations that aim to promote the production of local content. Specifically, commercial television broadcasters are required to air at least 730 hours of Australian content in 2013, 1,095 hours in 2014, and up to 1,460 hours in 2015 (and beyond) on any channels they operate other than their primary channel (known as multi channels).	Market access	Inputs	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Azerbaijan	2010	Legislation on public procurement gives preference to products of local manufacturers listed in Azerbaijan's Catalogue of Industrial Enterprises & Item List of Industrial Products.	Price preference	Govern-ment Procurem ent	Peterson (2013)
Bolivia	2009	Under procurement rules that were modified in 2007 and 2009, the government must give priority to small and micro-producers and peasant associations in procurements under USD 100 000. In addition, the government requires fewer guarantees and imposes fewer requirements on suppliers that qualify as small or micro-producers or peasant associations	Price Preferenc e	Govern-ment Procure-ment	USTR (2013)
Country	Year	Description	Benefit	Targeted market	Source
Brazil	2009	Brazil's development agency, BNDES, provides loans to wind-turbine development if they meet LCRs of 40-60%. Not all developers are using the LCR program. Of the 4,316MW contracted in the 2009 and 2010 tenders, BNDES only financed 1,342MW.	Govern-ment Loans/fun ds	Inputs	Bahar et al. (2013)
	2010	The Buy Brazil Act (law no. 12.349/2010) establishes preferences for Brazilian goods and services in government contracts, to be determined by the President, though not in excess of 25% above the price of foreign goods and services. For strategic IT and communications technology contracts, tenders will be restricted to goods and services developed with national technology. The procurement rules were further tightened as part of the Brasil Maior plan.	Price preference	Govern-ment Procure-ment	Peterson (2013)
	2010	Brazilian Development Bank (BNDES) financing (up to 100% for small and medium enterprises and up to 80% for larger companies) requires new capital goods (machinery and equipment) to meet national content indexes, in weight and value, equal to or greater than 60%, to follow the Basic Production Process (Processo Produtivo Básico), which entails a minimum set of operations necessary to certify the end product is Brazilian-made. Among other features, this requires that certain components be acquired from local manufacturers. Circular No. 55/2010 prohibited BNDES financing for the acquisition of airplanes; it also changed the financing system for the acquisition of new capital goods.	Governme nt loans/fund s	Inputs	Peterson (2013)
	2010	US companies seeking to enter Brazil's insurance and reinsurance market must establish a subsidiary, enter into a joint venture, or acquire or partner with a local company. Market entry for banks is subject to case-bycase approval. The Brazilian reinsurance market was opened to competition in 2007. However, in December 2010 and March 2011, the Brazilian National Council on Private Insurance (CNSP) effectively rolled back market liberalization. Resolution 225 requires that 40% of all reinsurance risk be placed with Brazilian companies. In addition, Resolution 232 allows insurance companies to place only 20% of risk with affiliated reinsurance companies.	Market access	Ownership / partner-ship	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Brazil (*cont.*)	2011	Brazil's "new" media law (Law 12.485) requires all channels to retransmit 3.5 hours of Brazilian content per week in primetime, half of which must be produced by Brazilian independent producers. It also requires the direct participation of a Brazilian advertising agency. Additionally, the draft regulations require hiring personnel through a Brazilian company located in Brazilian territory, and permitting Brazilian producers to own their creation of audiovisual products and derivative products, as well as the licensing rights. Revisions to these regulations are under consideration for 2013.	Market access	Inputs	Peterson (2013)
	2011	On 9 December 2011, the National Land Reform and Settlement Institute (INCRA) published new rules covering the purchase of Brazilian agricultural land by foreigners. Under the new rules, the area bought or leased by foreigners cannot account for more than 25% of the overall area in its respective municipal district. Additionally, no more than 10% of the land in any given municipal district may be owned or leased by foreign nationals from the same country. Congressional approval is required before large plots of land can be purchased by foreigners, foreign companies, or Brazilian companies with a majority of foreign shareholders.	Market access	Ownership / partner-ship	Peterson (2013)
	2012	On April 15, 2012, Brazil issued Decree 7761/2012 setting regulations on the new industrial and trade regime for the automotive sector: Transport equipment manufacturers must meet at least three of four criteria across investment in R&D; investment in engineering; completing a high share of production domestically, and carrying out energy-efficiency evaluations for 25% of cars. A gradual stepping-up regional/local content requirement will be allowed for newcomers across ten years.	Market Access	Inputs	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	Several Decrees have been approved establishing preference margins for certain national products in tendering procedures. 8%-25% on medical products. 14%-17% on some tractors, ransport trucks, fighting vehicles, road equipment, and ambulances. 20% on textiles, apparel, footwear, paper money for printing, locomotives, wagons, trains and car parts for railways, and discs for coins. 25% on some information technology related products, and 29% on drills and tractors.	Price preference	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	The procurement plan of the Brazilian healthcare program will establish up to 25% preferences for Brazilian medical technologies or medications in government contracts, in an effort to support indigenous industry.	Price preference	Govern-ment Procure-ment	Peterson (2013)
	2012	Law No. 12715 established REPNBL-Redes, the special taxation regime of the National Broadband Programme for the Establishment of IT Broadband Supporting Networks. This measure if enacted will provide tax benefits to locally manufactured and locally developed technologies used in Brazil's national broadband plan.	Tax break/cred it	Inputs	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Brazil (*cont.*)	2012	The tender proposal (Edital de 2,5 GHz e 450 MHz CP 4/2012) approved by the Brazilian Agency of telecommunications (ANATEL) for the sale of 450 MHz and 2.5 GHz frequencies increases the requirements for national content, raising the minimum level of Brazilian telecommunications equipment. During 2015–16, the overall level of national content required in the development of 4G telecommunications networks is scheduled to jump to 65% (including 15% investment in Brazilian technology) and from 2017 onward the level jumps to 70% (including 20% investment in Brazilian technology).	Market access	Inputs	Peterson (2013)
	2012	Preference in government procurement favouring local bidders (20% preference margin) on certain semi-finished products of iron, steel or non-alloy steel (disco para moeda) NCM 7207.19.00; 7326.90.90) locally produced	Price preference	Govern-ment Procure-ment	WTO (2014)
	2013	"Special Tax Regime for the National Broadband Plan for Implmentation of Telecommunication Networks (REPNBL-Redes)" stipulating certain production steps or technology activities in Brazil	Tax break/-credit	Governme nt Procurem ent	WTO (2014)
	2013	Law No. 12794 of 2 April 2013 established REIF, the Special Regime of Incentives for the Development of Infrastructure for the Fertilisers Industry. Tax benefits are conditional upon fulfilment of requirements of investment in R&D and technological innovation and of a minimum%age of local content in relation to the overall value of the project	Tax break/-credit	Inputs	EC Tenth Report on Potentially Trade-Restrictive Measures
	2013	An LCR went into full effect in Brazil's 11th licensing round for oil and gas in April 2013; bids are assessed based on the following criteria: signature bonus (40%), the mandatory exploration program (40%), and the minimum local content equirement (20%) of each bidder.	Market access	Inputs	Peterson (2013)
	2013	On 5 August 2013, the National Development Bank of Brazil (BNDES) published a resolution that extends the Program for Sustaining Investment (PSI) applicable to capital goods until 2014. This measure is part of Plano Brasil Maior. The PSI finances operations at subsidized interest rates ranging from 3.5% to 5%. The interest rate reduction applies only to goods produced in Brazil by manufacturers or suppliers holding a credit line in the form of a BNDES card (cartao BNDES). The average general rate without the subsidy is 9%, depending on the size of the enterprise. To obtain a manufacturer BNDES card, the applicants are required to comply with a level of at least 60% of the nationalisation index (percentage of national components, relative to the total equipment) or produce goods that are part of a Basic Productive Process (Processo Produtivo BÃ¡sico), which is a set of production stages necessary to be under a special tax regime.	Govern-ment loans/-funds	Inputs	Global Trade Alert (20 January 2014)

Country	Year	Description	Benefit	Targeted market	Source
Brazil (*cont.*)	2013	On May 14, 2013, the Government of Brazil published Decree 8.002, as part of Plano Brasil Maior, establishing preferential treatment of local construction products in public tenders.The preferences are set to expire on December 31, 2015. These preferences are applicable to goods classified under the following headings of MERCOSUR's Harmonized System: 8429, 8430, 8424, 8432, 8433, 8701 and 8716.	Price preference	Govern-ment Procurem ent	Global Trade Alert (20 January 2014)
Cambodia	2012	Cambodia promulgated a law on public procurement in January 2012, which codified existing procurement regulations that provided for competitive bidding, domestic canvassing, direct shopping, and direct contracting. Competitive bidding is mandatory for the purchase of goods or services worth more than KHR 100 million (approximately USD 25 000). Bidding is restricted to local companies if the value is less than 1 billion riels (USD 250 000) for goods, less than 1.2 billion riels (approximately USD 300,000) for construction projects, or less than 800 million riels (approximately USD 200 000) for services. International competitive bidding is required for expenditures over those amounts.	Market Access	Govern-ment Procurem ent	USTR (2013)
Canada	2009	The Government of Canada provided CAD 175 million to the Canadian Coast Guard for the purchase of new vessels and improvements to existing vessels, requiring work to be done by shipyards within the regions of the vessel's homeport.	Govern-ment loans/ funds	Govern-ment Procure-ment	Peterson (2013)
	2012	British Columbia's amendments to the Freedom of Information and Protection Of Privacy Act require that personal information collected by public sector agencies in Canada must be stored or accessed only in Canada, and the service provider must report any foreign demands for data disclosure.	Market access	Data residency	Peterson (2013)
	2012	Nova Scotia's and British Columbia's amendments to the Personal Information International Disclosure Act require that personal information collected in Canada must be stored or accessed only in Canada, but a public body may override the rules where storage or access outside of the respective province is essential.	Market access	Data residency	Peterson (2013)
China (People's Republic of)	2008	In November 2008, China implemented a $586 billion economic stimulus package, allocating a major portion of the government spending to renewable energy projects. A circular jointly released by nine government organizations requires that preference be given to domestic products. This combination of measures virtually ensures a massive volume of sales of domestically manufactured renewable energy equipment.	Price preference	Governme nt Procurem ent	Peterson (2013)
	2009	Under the Clean Development Mechanism (CDM) implementation rules set up by China "The measures for Operation and Management of Clean Development Mechanism (CDM) Projects", any project owner applying for CDM registration must be a Chinese company or a Joint Venture with at least 51% Chinese ownership	Market Access	Ownership / Partnershi p	EC Market Access Database
	2010	Measures to promote the domestic film industry include preferential taxes and two-thirdsof screen time reserved for local films (applicable since 2001) under the Guiding Opinions on Promotion of Prosperous Development of the Film Industry of 21 January 2010.	Market access	Inputs	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
China (People's Republic of) (*cont*.)	2011	The first draft of the 12th five year plan for new-energy vehicles included provisions that could compel foreign auto-makers that want to produce critical components in China to share critical technologies by requiring the companies to "present independent R&D capability and intellectual property rights, with the equity of the Chinese party no less than 51%". The recently revised Catalogue for Guidance of Foreign Investment has for the first time formalised this investment restriction on automotive components "Manufacture of key parts and components of new energy automobiles: high energy power batteries (with the proportion of foreign investment not exceeding 50%)"	Market access	Ownership / partner-ship	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	Provisional telecom laws require all foreign firms that provide telecom services to enter a joint venture with a Chinese firm. This would also apply to data centers and cloud computing.	Market access	Ownership / partner-ship	Peterson (2013)
	2012	On 13 February 2012, the Chinese State Administration of Radio, Film and Television (SARFT) tightened the regulation for foreign TV programs. The regulation includes a ban of foreign TV shows and films between 7.30pm and 10pm. Furthermore, at most 25% of all TV series can be foreign made.	Market Access	Inputs	Global Trade Alert (20 January 2014)
Croatia	2012	Croatia introduced an LCR linked to a FiT. If the producers do not meet a 60% LCR, then they will receive between 93% and 99% of the FiT, depending on the exact%age of LC used. Not currently inforce, and the law may change based on Croatia's planned EU accession.	Price support	Inputs	Kuntze and Moerenhout (2013)
Ecuador	2008	The Ecuadorian Constitution (29 September 28, 2008) stipulates in Article 288 the "prioritization of domestic products and services in public procurement". The National Procurement System Organic Law 30 establishes as one of its aims to be a "dynamic element of production" (Article 9) and it also states that "specifications of a public procurement will contain evaluation points that encourage national or local participation, by a preferential margin, for suppliers' works, goods and services, including consultancy, according to the parameters set by the Ministry of Industry and Competitiveness" (Article 25)	Price preference	Government Procurement	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	On 11 June 2012, Ecuador's Trade Committee adopted Resolution No. 64 introducing incremental import tariffs on completely knocked-down (CKD) parts for radios, motor bicycles, televisions, cellular phones and DVD players. The incremental import tariff is negatively correlated to local content requirements: The higher the rate of local content, the lower the import tariff and vice versa. This measure entered into force on 22 June 2012.	Tax break/credit	Inputs	Global Trade Alert (20 January 2014)
	2013	A new law adopted in June imposed a set of new limits on the audio-visual sector. The Ley Orgánica de Comunicación requires Ecuadorian media to dedicate at least 60% of television programming to locally-produced content. Should the volume of local independent productions not be sufficient, the law provides that "ibero-american" productions could fall under the quota.	Market access	Inputs	WTO (2014)

Country	Year	Description	Benefit	Targeted market	Source
Egypt	2011	In Egypt, the number of foreign employees in a company is limited to a maximum 10% of the total number of employees (25% for companies established in free zones). According to the Ministerial Decree 90/ 2011, a work permit for a foreigner can be granted only if an Egyptian substitute cannot be found, and for a maximum of three years. Companies are also obliged to employ and train Egyptian assistants for the foreign experts.	Market Access	Labour	EC Tenth Report on Potentially Trade-Restrictive Measures
France	2011	The draft decree amending an article of the Code of Electronic Communications related to lawful interceptions includes a "territorial" restriction requiring that the systems for interception of electronic communications must be established in France, and encrypted with state-approved technology if data is transmitted outside the jurisdiction. Only employees entrusted by the state have access to the systems required for interception and the data produced by these systems. When technical obstacles warrant, derogations from the draft's restrictions can be granted on agreement with the State. The French Delegation to the OECD notes that this measure has been implemented to meet National Security objectives.	Market access	Data residency	Peterson (2013)
Ghana	2013	On November 20, 2013, the Parliament of Ghana adopted Legislative Instrument L.I. 2204 entitled 'Petroleum (Local Content and Local Participation in Petroleum Activities) Regulations, 2013'. Under the regulations, anyone 'carrying out a petroleum activity shall ensure that local content is a component of the petroleum activities engaged in'• . As well as a local content requirement, the instrument provides Ghanian companies with a first preference in the grant of licenses, a minimum level of domestic equity, and local staff quotas.	Market Access	Inputs	Global Trade Alert (20 January 2014)
Greece	2011	Article 6 of Greek law no. 3917/2011 establishes a data residency requirement.	Market access	Data residency	Peterson (2013)
	2012	Greece scheme includes a 10% bonus to the FiT if 70% or more of the components were sourced from the EU or the EEA	Price support	Inputs	Dahou, Youngman and Ang (2015)
India	2009	To introduce newer wind turbine models (or to modify existing models), the new models have to be registered with the Centre for Wind Energy Technology (C-WET), which requires establishing an assembly facility in India. Third-party certification is required in addition to the design assessment. State agencies require C-WET certification for allowing connection to the grid.	Market access	Ownership /partner-ship	Peterson (2013)
	2010	India decided to bar imports of certain equipment used in electricity generation on 20 January 2010. Ultra mega power projects (UMPP) are no longer allowed to source equipment from abroad, but are required to tender domestically. In a related move, the Central Electrical Authority asked all state and central utilities to include an "indigenous manufacturing clause" in their equipment contracts. Likewise, other public utilities are asked to source their equipment from domestic providers.	Market access	Inputs	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
India *(cont.)*	2011	New guidelines from India's Ministry of Communication and IT regulating government purchases include Made in India clause requirements and grant price preferences (up to 30%) for locally manufactured electronic equipment and IT products.	Price preference	Govern-ment Procure-ment	Peterson (2013)
	2011	India's Ministry of New and Renewable Energy released guidelines on local content requirements as part of the country's Jawaharal Nehru National Solar Mission. For photovoltaic projects based on crystalline silicon technology, the guidelines require that all project developers use modules manufactured in India; for such projects selected in FY2011–12, developers must use both modules and cells manufactured in India. For projects based on solar thermal technology, the guidelines require 30% local content in all plants and installations.	Market access	Inputs	Bahar et al. (2013)
India	2011	Local content requirements were noted for railway safety technology regarding 100% local content requirements for the Governmental procurement of certain railway safety technology products.	Market Access	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	India announced intentions to increase the foreign direct investment caps on foreign-owned stores, allowing up to 100% ownership for single-brand stores (typically flagship stores of consumer goods producers) and a maximum stake of 51% by foreigners in multibrand stores (general retail). However, the government also included several safeguards, which it may impose in the future. The safeguards under consideration include numerous LCRs, such as reserved employment for rural youth, and a%age of manufactured products sourced from SMEs.	Market access	Ownership / Partner-ship	Peterson (2013)
	2012	The Indian cabinet approved new rules requiring that all electronic software and hardware products with "security implications" that are purchased by government agencies or "Government Licensees" must contain at least 25% Indian content by the end of the first year of implementation, and 45% by the second year of implementation.	Market access	Govern-ment Procure-ment	Peterson (2013)
	2013	Effective from 31 May 2013 a new Defence Policy was notified by the Indian Government. Under the new policy, priority is to be given to purchases from the Indian defence industry, the classification of which is based on minimum local content requirements (starting from 30%, on a cost basis).	Price preference	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
Indonesia	2009	The European Union and the United States requested that Indonesia clarify new measures applicable to investment in Indonesia's broadband telecommunications sector, particularly fair bidding processes between domestic and foreign firms for government auctioned wireless spectrum (at issue is a LCR of 30 to 50% for any bidder).	Market access	Inputs	Peterson (2013)
	2009	Indonesia issued a regulation that specifies the scope of the obligation for foreign investors to divest mining concessions in Indonesia. It requires that within five years of commencing production, 20% of the foreign capital must be sold to local parties, including central, provincial, or regional governments, and SOEs.	Market access	Ownership / Partner-ship	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Indonesia *(cont.)*	2009	Indonesia passed new laws abolishing monopoly power for certain postal services and established specific conditions for foreign providers to cooperate with local service providers, including that the majority of equity participation in joint ventures should be Indonesian and that joint ventures between foreign and domestic providers will be limited to provincial capitals, international airports, and seaports.	Market access	Ownership / Partner-ship	Peterson (2013)
	2009	Indonesian regulation PTK No. 007 Revision-1/PTK/IX/2009 requires local and foreign bidders for energy service contracts to use a minimum of 35% domestic content in their operations.	Market access	Inputs	Peterson (2013)
	2009	Indonesia's Ministry of Energy and Mineral Resources (MEMR) Regulation No. 7/2012 implements 2009 law calling for an export ban on unprocessed metals or nonmetallic minerals and restrictions on foreign investment in the mining industry. Effective May 6, 2012, mining firms will be banned from exporting unprocessed metals or nonmetallic minerals, unless they submit a notification to the government indicating their plans for smelter construction. This provision would require firms to locate their mineral processing facilities on-shore in Indonesia. Additionally, implementing regulations created a timetable that requires that 51% of shares in operating mining companies must be owned by Indonesian shareholders after 10 years of production.	Market access	Ownership / partner-ship	Peterson (2013)
	2009	Indonesian authorities introduced implementing regulations to the Law on Shipping (17/2008, of 8 April 2009) that limit the right to cabotage to Indonesian vessels only. As of 1 January 2011 only Indonesian vessels have the right to transport passengers and cargo within the country	Market Access	Inputs	EC Tenth Report on Potentially Trade-Restrictive Measures
	2009	The Ministry of Industry adopted on 29 May 2009 a regulation (49/2009) requiring the use of domestic products and services in 558 sub-sectors for public procurement. The regulation relates to both domestic and foreign companies established in Indonesia, which could be considered as local producers in several sectors (raw materials, equipment, machinery, supplies, construction materials, agriculture and agri-food, energy, telecommunication sector etc.). Domestic products are defined as 'goods/services (including construction-design and engineering) produced or prepared by company investing and producing in Indonesia, with possibility to use imported raw material or component in the production or working process'. The law is effectively in force since 12 August 2009.	Market Access	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures

Country	Year	Description	Benefit	Targeted market	Source
Indonesia *(cont.)*	2009	Ministry of Industry Decree 04/2009 (dated 15 January 2009) stipulates a domestic content obligation for electric power generation infrastructure construction. Coal and water power generators with less than 100 MW shall be constructed and managed by a national company, and with above 100 MW it can be a foreign company but it must work together with a national company. For geothermal power, the limit is 110 MW for similar conditions. The buyer of these construction services must give a price preference to locally produced goods and services. The size of discount depends on the category of costs, between 7.5 – 30% The attachment of this regulation stipulates the required levels of domestic content for the different sectors - coal, water power, geothermal and distribution, as well as for different sub-categories of goods and services. The local content requirements range from 15% up to 96% for different categories, but mostly are above 50%. Ministry of Industry introduced administrative sanctions for not following the regulation, in the form of penalties or blacklisting. Foreign products can be used only when locally produced goods are not available. The Decree will affect the procurement related to the Government's 10 000 MW electricity crash program.	Price preference	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2010	In August 2010, a new Presidential Regulation (PerPres 54/2010) was adopted. i) local content: the Regulation sets a 40% requirement on local goods and services across the board. ii) Partnership obligations: the Regulation provides that foreign companies can only participate in procurement of construction projects with a value higher than approximately USD 11 million and in procurement of goods and services beyond a value of USD 2 million and in partnership with a domestic company.	Market Access	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2010	Indonesia's Negative Investment List (DNI) (Presidential Regulation 36/2010) continues to restrict foreign investment. ICT in particular falls largely under the sensitive area "Communications Services." Maximum foreign capital ownership varies between subsectors, ranging from 49% (e.g. for internet service providers) to 95% for data communication system service providers.	Market access	Ownership / partner-ship	Peterson (2013)
	2010	Article 98 of Presidential Decree 54/2010 gives a public procurement preference to goods and services with a minimum of 25% local content (even where the bid is 15% higher in price) and applies to bids over USD 550 000. Article 97 of the decree awards dditional preference points to vendors with investments in Indonesia and partnerships with local small and medium-sized enterprises.	Price preference	Govern-ment Procure-ment	Peterson (2013)
	2011	The Horticulture Law of October 2011 reduced the foreign equity cap from 95%/100% down to 30%. This entails serious implications not only for future investments but also for established investors as the legislation does away with the grandfathering principle.	Market Access	Ownership / partner-ship	EC Tenth Report on Potentially Trade-Restrictive Measures

Country	Year	Description	Benefit	Targeted market	Source
Indonesia *(cont.)*	2011	Article 25 of Indonesia's Undang-undang Informasi dan Transaksi Elektronik states that, "Any provider of Electronic System for public services that operates data centre must place the data centre and disaster recovery centre operations in Indonesia." In 2011 the Ministry of Communications (KOMINFO) required Research in Motion and Google to build server and data centers inside the country and is also approaching other companies like Visa and Mastercard with similar requests.	Market access	Data residency	Peterson (2013)
	2011	Indonesia issued two decrees: a wireless broadband decree that requires local content of 30 to 50% in the wireless sector and a telecommunications decree that requires all service operators spend 35% of their capital outlays on domestically made equipment. Currently, at least 40% of equipment must be locally sourced, but within five years this figure rises to 50%.	Market access	Inputs	Peterson (2013)
	2012	Law 16/2012 on Defence has been adopted, requiring 85% local content in the production of defence equipment, starting at 35% and gradually (in five years) to 85%.	Market Access	Govern-ment Procurem ent	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	In June 2012, Indonesia's Ministry of Finance implemented Regulation No. 76/PMK.011/2012, which eliminates import tariffs on machinery, goods and materials used in the motorized vehicles assemby and components industries for companies that locally purchase at least 30% of the total value of machines. While the LCR is not "mandated," the resolution incentivizes companies to buy local.	Tax break/-credit	Inputs	Peterson (2013)
	2012	In October 2012, Indonesia's Ministry of Trade issued regulation 68/M-DAG/PER/10/2012, which sets a 150 maximum number of outlets that can be directly owned by foreign retailers; to own more than this amount, at least 40% must be franchised to other parties. In addition, 80% of the goods sold must be locally produced.	Market access	Ownership / partner-ship	Peterson (2013)
	2013	Draft Industry Law: Restricting public procurement and imposing local content requirements: Art. 57 specifies that 'to empower domestic industry', the government shall encourage increased use of domestic products, not only by governmental bodies in widest definition (SOEs and beyond), but also where public finance is involved in private companies (PPP, cooperation, etc.). In addition (art. 59) the government can facilitate private industry preferring domestic products and (Art. 61) shall encourage private businesses and society to increase the use of domestic products.	Govern-ment loans/-funds	Govern-ment Procure-ment	EC Market Access Database
Israel	2013	On 19 May 2013, the Israeli government signed an extension to the so called "Defensive Textile Law". The new version requires all official security forces: army, police, border patrol etc. to buy Israeli made products. The security forces are only allowed to pick a foreign competitor if the offer is less than half of the price offered by Israeli firms.	Price preference	Govern-ment Procure-ment	Global Trade Alert (20 January 2014)
Italy	2011	Italy enacted LCRs for the subsidisation of solar energy. The law foresees an additional 5% to 10% incentive for project developers who source components in the European Union.	Price support	Inputs	Bahar et al. (2013)

Country	Year	Description	Benefit	Targeted market	Source
Kazakhstan	2009	Kazakhstan adopted changes to its law on public procurement to include a "local clause" in public procurement for goods (20%) and services (15%). Companies with more than 50% foreign shareholding are considered foreign unless they fulfill three criteria for qualifying as a "national producer."	Market access	Govern-ment Procure-ment	Peterson (2013)
	2009	Kazakhstan introduced an LCR in the terms of subsoil use contracts. It also tightened legislation with regard to the definition of a domestic company in the subsoil sector, requiring that at least 95% of employees be domestic citizens.	Market access	Labour	Peterson (2013)
	2010	Government Decree No. 423 introduces a list of common goods that are to be bought from domestic producers, such as bread, pasta, sweets, cereals, milk, milk products, butter, eggs, salt, and nonalcoholic beverages.	Market access	Inputs	Peterson (2013)
	2011	In 2011, Google was notified of an order issued by Kazakhstan's Ministry of Communications and information that required all .kz domain names to operate on physical servers within the country's borders. Within a week of Google's protest, the government stated that the order no longer applies to previously registered domains (e.g. google.kz).	Market access	Data residency	Peterson (2013)
	2012	Kazakhstan introduced new rules (Resolution No. 1028) on local content in the terms of subsoil use contracts. New minimum LCRs are set at 16% for goods and 85% for works and services.	Market access	Inputs	Peterson (2013)
	2013	On March 29, 2013, the Government of the Republic of Kazakhstan (according to Resolution No. 298) introduced foreign working permit quotas for the priority project "Reconstruction and modernisation of Atyrau oil refinery" in 2013. In addition, the employer (Kazakhstani subsidy of SINOPEC Engine) must comply with the ratios of local to foreign employees.	Market Access	Labour	Global Trade Alert (20 January 2014)
Kenya	2012	In October 2012, Kenya enacted the Mining Act, which requires all foreign investors in the mining sector to maintain a minimum of 35% of local shareholder in order to apply for exploration and mining licenses.	Market access	Ownership / partner-ship	Peterson (2013)
Malaysia	2010	Since 2010, important restrictions have persisted in the government procurement regime. International tendering is only allowed when goods and services are not available locally, and in most cases, foreign suppliers need to resort to a local partner/intermediary to submit tenders. Domestic (bumiputera) suppliers benefit from a preferential treatment, consisting in a price bonus. All individuals, companies or corporate bodies intending to participate in government procurement of works, supplies and services are required to be approved by and registered with the Ministry of Finance.	Price preference	Govern-ment Procure-ment	EC Market Access Database

Country	Year	Description	Benefit	Targeted market	Source
Malaysia *(cont.)*	2010	Malaysia has adopted new guidelines regulating distributive trade. These guidelines only apply to foreign players. Significant limitations on the possibility to open hypermarket outlets continue to apply. Licenses can be granted only subject to a sort of ENT (economic need test), based on minimum population thresholds. As mentioned, these limitations are discriminatory, as they apply only to foreign operators. Besides, foreign operators are barred altogether from opening outlets with surface below 2000sq feet. Foreign operators of hypermarket must have 30% of their shareholding allocated to bumiputera partners (this is no longer the case for non-hypermarkets i.e. for smaller surfaces). Shop owners will continue to be requested to provide 30% of shelf space to bumiputera suppliers. Furthermore, the whole licensing process lacks transparency and clarity, leaving economic operators struggling to understand future market conditions.	Market Access	Ownership / Partner-ship	EC Market Access Database
	2010	Malaysia implemented a small 'bonus' FiT scheme for biogas, biomass, and solar PV producers when using LC. An additional 0.01 USD/kWh for photovoltaic modules, and 0.003 USD/kWh for solar inverters	Price support	Inputs	Bahar et al. (2013)
Mexico	2008	From 2008 onwards, Mexico has amended its government procurement law to specify international access to its market. Article 28 of the Ley De Adquisiciones, Arrendamientos Y Servicios Del Sector Público allows tenders to be either *national* (restricted to people of Mexican nationality, or from a country with a international agreement) or *open international* where people from any country can bid, but domestic suppliers are given a 15% preference.	Market access	Govern-ment Procure-ment	Ley De Adquisiciones, Arrendamientos Y Servicios Del Sector Público
	2010	In October 2010, Mexico published new regulations to national content for government procurement. These regulations establish a minimum national content of 60% in 2011 and 65% for 2012 (but included exceptions of 30 to 35% for some light manufacturers and automobiles). The federal regulations only ply when federal funds are used, and Mexican states can develop their own rules.	Market access	Govern-ment Procurem ent	Peterson (2013)
Mongolia	2012	The Mongolian parliament passed a law restricting foreign investors from majority control in “strategic industries,” unless the deals are approved by Parliament. President Tsakhiagiin Elbegdorj and some Mongolian lawmakers indicated that they will revisit the restrictions following parliamentary elections in June 2012 due to a need for balance between encouraging local corruption and protecting the “fundamental interests” of the Mongolian people.	Market access	Ownership / Partner-ship	Peterson (2013)
Nigeria	2009	Buy-Made-In-Nigeria directed all official catering to be sourced through domestic producers and uniforms and boots of the Nigerian Armed Forces to be sourced locally.	Market access	Govern-ment Procure-ment	Peterson (2013)
	2010	The Nigerian Oil and Gas Industry Content Development Act (2010) sets comprehensive and detailed discriminatory requirements for projects in the oil and gas industry. In part, the law increased indigenous participation in the oil and gas industry by prescribing minimum thresholds for the use of local services and materials and to promote the employment of Nigerian staff. Such indigenous or Nigerian companies would be required to have no less than 51% of their equity shares held by Nigerians.	Market access	Ownership / Partner-ship	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Paraguay	2009	Paraguayan public bodies that spend national stimulus funds must give a minimum 70% preference to national goods and services.	Price preference	Govern-ment Procure-ment	Peterson (2013)
Philiipines	2011	The National Biofuels Board regulators are going ahead with the E-10, or 10% ethanol blend mandate, but are allowing ethanol producers and oil companies six months. The Philippine DOE released a circular in 2011, stating that the E-10 blend will be mandatory effective July 16th, and that for the following four years, ethanol may be imported, but after July 2015, imports will be allowed only to make up for shortfalls in local production.	Market Access	Inputs	Bahar et al. (2013)
Russia	2008	Instruction n° 427 of 5 December 2008 by the Ministry of Economic Development "On the Conditions for Access of Foreign Origin Commodities for the Purposes of Placing Orders for Commodity Supplies for the Government and Municipal Use" determines conditions for access to the Russian market for a large number of goods and services from foreign countries. It enables the national producers to win bidding with a price which is up to 15% higher than that of a foreign producer. The new 'Buy Russian' provision was considered as an anti-crisis measure, which would only apply for a limited period of time. Despite an initial time-limit of 2010, the law was prolonged in January 2011 extending its validity until the end 2011. The Ministry of Economic Development's Instruction No 120 of 12.03.2012 was a modified version of the Ministry's Instruction No 427. In spite of its previously stated intention to radically curtail the preferences for domestic producers in public procurement, a large number of goods from the list remained intact. MED's Instruction was entered into force on 6 May 2012.	Price preference	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2009	The Russian Ministry of Agriculture introduced order no. 82, which conditions subsidized loans to farmers on the origin of agricultural equipment and primary agricultural products they purchase.	Governme nt loans/fund s	Inputs	Peterson (2013)
	2009	Russian government decree no. 533/1018/137H increased an existing import tariff discount (lowering he usual tariff rate of 30% to a rate under 5%) but restricted eligibility of the discount to auto parts imported by companies which produce all their car models in Russia.	Tax break/ credit	Inputs	Peterson (2013)
	2009	Subsidies for executive bodies, regional authorities, militia, communal services and medical establishments were granted to buy locally produced passenger cars, transportation cars and special vehicles (32.5bn roubles in 2009, 20bn roubles for 2010)	Price preference	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2010	Russian rules mandate localization rates for telecommunications equipment sold within Russia. The level of localization of manufacturing of such equipment differs between types of equipment and for the first three years of manufacturing. Specifically, the manufacturer has to be a resident of the Russian Federation. The firm should have its own scientific-manufacturing base or cooperation with local enterprises that perform the manufacturing activity.	Market access	Inputs	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Russia *(cont.)*	2010	Per Joint Order No. 678/1289/184H, effective February 2011, between the Ministry of Economic Development and Ministry of Industry and Trade, automotive component producers qualifying for duty-free import into Russia must make at least 300 000 cars/year (up from 25 000); at least 30% of engines must be produced in Russia; and local content of components must amount to 60% by 2020. After consultations with the US and the EU, Russia agreed to change the program's termination date from 2020 to 2018.	Market access	Inputs	Peterson (2013)
	2010	Local content requirement obligations and 15% price preference for domestically produced telecom equipments	Market access	Inputs	WTO Trade Monitoring Database
	2013	On 17 September 2013, the Russian Ministry of Economic Development announced that the state entity Russian Agency for Export Credit and Investment Insurance (EXIAR) will provide insurance coverage for a new credit scheme of OJSC, Sberbank of Russia. Selected Russian exporters can benefit from this state support. One requirement to receive insurance or a loan is the presence of a Russian component in the exported goods/services.	Govern-ment loans/ funds	Inputs	Global Trade Alert (20 January 2014)
	2013	The Russian Government issued Decree 141 introducing state support for exports of local industrial goods. Russian exporters of industrial goods with not less than 30 per cent Russian content will be supported by a state guarantee.	Govern-ment Loans/ funds	Inputs	Global Trade Alert (1 April 2014)
Saudi Arabia	2012	In October 2012 the Consultative Assembly of Saudi Arabia (or Shura Council) passed a bill that effectively requires that all operation and maintenance contracts in the public utilities sector employ Saudis. The assistant chairman of the council said that no worker should be employed other than a Saudi unless the job requires a certain specialization or no Saudi workers are available.	Market access	Labour	Peterson (2013)
South Africa	2010	South Africa merged its National Industrial Participation Programme (NIPP) with its Competitive Supplier Development Programme (CSDP), which controls contracting by South Africa's nine state-owned enterprises (SOEs). South African SOEs are now required to demand 30% local purchases for any outlay of funds over USD 10 million, disproportionately affecting government contracts in the energy, rail, and aviation sectors.	Market access	Govern-ment Procure-ment	Peterson (2013)
	2011	South African Regulation Gazette No. 9544 - Regulasiekoerant Vol. 552 - No. 34350 (8 June 2011) revised preferential procurement regulations granting preferences for local products and Broad-Based Black Economic Empowerment "B-BBEE" scheme effective December 2011.	Price preference	Govern-ment Procure-ment	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
South Africa *(cont.)*	2011	In December 2011, provisions for the designation of sectors from which government will exclusively procure locally were finalised and will come into force. The sectors earmarked for exclusive local procurement are power pylons, railway rolling stock, buses (bus bodies), canned and processed vegetables, clothing and textiles, footwear and leather products, and television set top boxes. A second round of designations was announced in 2012, with pharmaceuticals, electrical cables and yellow cables, and office and school furniture. The level of local content for designated sectors varies between 35% and 100%, and is determined on a product-specific basis.	Market access	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2012	South Africa implemented a green economy accord and pledged to procure 3,725MW of renewable energy by 2016. It wanted to create local industrial capacity with initial LCRs of 35%, increasing to 75%. The Govt. owned Industrial Development Corporation provided R25 billion in funding and low-cost loans to support this policy	Govern-ment Loans/ funds	Inputs	Kuntze and Moerenho ut (2013)
	2013	On 29 January 2013, the South African Department for Industry and Trade has designated valves, manual and pneumatic actuators, electrical and telecommunication cables, and components of solar water heaters as subject to the local content regulations under the Preferential Procurement Policy Framework Act. Further details, such as the amounts and shares of local content involved, are still unknown: they will be revealed in the 2013 Industrial Policy Action Plan, forthcoming in April.	Price preference	Govern-ment Procure-ment	Global Trade Alert (20 January 2014)
Switzerland	2009	The Swiss Federal Council strengthened protection for Made in Switzerland designations, by increasing both the amount of the raw materials' weight that must come from Switzerland, if the product is promoted as Swiss, from 50 to 80% and the extent of the main manufacturing processes that must be done in Switzerland from 50 to 60%.	Domestic branding	Inputs	Peterson (2013)
	2009	The Swiss Federal Council approved a support package to the agricultural sector that provides price compensation for food manufacturers to buy locally sourced raw materials.	Subsidies	Inputs	Peterson (2013)
Chinese Taipei	2011	In Chinese-Taipei, The Financial Supervisory Commission (FSC) has promulgated regulations to have most consumer financial institutional data moved and processed "on-shore".The FSC has since received authorization to enforce the regulation, which calls for financial institutions to comply within four years. In addition, the FSC has established more stringent rules in order for financial institutions to process/move data off-shore.	Market access	Data residency	ITIF (2013)
Tanzania	2009	Tanzania increased tariffs on beer, wine, and tobacco products that did not meet LCRs of 75%.	Tax break/ credit	Inputs	Peterson (2013)
Turkey	2008	Turkey's public procurement legislation allows for a 15% price preference in favor of domestic suppliers when participating in tenders set aside for Turkish goods and suppliers. A prime minister circular of December 2008 encouraged Turkish contracting authorities to apply those provisions more rigorously.	Price preference	Govern-ment Procure-ment	Peterson (2013)

Country	Year	Description	Benefit	Targeted market	Source
Turkey *(cont.)*	2010	Turkey implemented local content bonuses for different components of a wind turbine (tower, blade, mechanical, and electrical equipment). The bonuses increase the wind feed-in tariff by up to 50%.	Tax break/ credit	Inputs	Bahar et al. (2013)
	2013	Turkey created a new obligation on gasoline refiners, fuel blenders and distributors to ensure that, starting 1 January 2013, all gasoline sold in the country contains 2% ethanol by volume, increasing to 3% starting 1 January 2014. Obligated parties are required to use only domestically produced ethanol.	Market Access	Inputs	Bahar et al. (2013)
Ukraine	2012	Ukraine introduced LCRs for obtaining a specific feed in tariff for electricity produced from renewables. The law stipulates that government incentives for electricity production from alternative energy sources shall apply on condition that at least 15% of the cost of the construction of the respective facility producing electricity must comprise materials, works, and services of Ukrainian origin.	Market access	Inputs	Bahar et al. (2013)
	2013	On 4 April 2013 Parliament approved Law #11100 "On public procurement". It requires proving the "ownership of production capacities and/or service centres on the territory of Ukraine" in order to qualify for public procurement tenders.	Market Access	Ownership / Partner-ship	EC Tenth Report on Potentially Trade-Restrictive Measures
United States	2008	Massachusetts 'Commonwealth Solar II provides rebates for homeowners and businesses that install solar PV. Additional bonuses and incentives are provided for installations using components manufactured in Massachusetts.	Subsidies	Inputs	Kuntze and Moerenhout (2013)
	2008	Indiana code Title 5, Article 16, chapter 8 related to Steel procurement for public works was amended to reflect that any steel or foundry products necessary for every construction, reconstruction, alteration, repair, imporvement or maintenance of public works must be made in the United States.	Market Access	Govern-ment Procure-ment	Indiana General Assembly website
	2009	Congress included a Buy American requirement in the American Recovery and Reinvestment Act of 2009 (designated as H.R.1, now Public Law 111-5), an omnibus measure that is better known as the stimulus package. The bill was signed into law by president Obama on 17 February 2009. The stimulus bill generally requires that all of the iron, steel, and other manufactured goods used in the program be made in the United States. In response to the administration's concerns over sending a protectionist message, the Senate amended the bill to specify that these provisions shall be applied in a manner consistent with United States obligations under international agreements. Another provision of the law (section 604) generally requires that funds appropriated or otherwise available to the Department of Homeland Security may not be used for the procurement of certain covered items unless 'grown, reprocessed, reused, or produced in the United States.'	Market Access	Gover-nment Procure-ment	Global Trade Alert (20 January 2014)
	2009	The Omnibus Appropriations Act of 2009 provided procurement funding to US agencies with Buy America requirements	Market Access	Govern-ment Procure-ment	Governme nt Publishing Office

Country	Year	Description	Benefit	Targeted market	Source
United States *(cont.)*	2010	An omnibus spending bill (Public Law 111-147), commonly known as the jobs bill, contained Buy American clauses related to Department of Transportation infrastructure projects.	Market access	Government Procurement	Peterson (2013)
	2010	The National Defense Authorization Act for FY2010 included Buy American requirements. The proposals related to small arms and uniform procurement and limited the number of foreign workers on construction projects in the relocation of facilities to Guam. Most of these provisions were stripped after reconciliation with the Senate version of the bill, except for a weaker provision relating to procurement of small arms from the "production industrial base."	Market access	Government Procurement	Peterson (2013)
	2010	The Consolidated Appropriations Act of 2010 provided procurement funding to US agencies with Buy America requirements	Market Access	Government Procurement	Government Publishing Office
	2011	Under Louisiana state law introduced in 2011 (related to the Procurement of Domestic Products Act), US manufacturers within a 5% of the lowest price are to be offered the contract at the lowest price.	Price preference	Government Procurement	Louisian State Legislature website
	2011	The legislature of the state of Ohio enacted into law on 30 June 2011, the state operating appropriations for fiscal years 2012 and 2013 (bill HB 153). The bill amended the state's laws governing bidding to allow a regional transit authority to give preference to goods produced in the United States in accordance with the Buy America requirements in the "Surface Transportation Assistance Act of 1982.	Price preference	Government Procurement	Global Trade Alert (20 January 2014)
	2011	The legislature of the state of Ohio enacted into law on March 23, 2011, the appropriations for transportation and public safety for fiscal years 2012 and 2013 (bill HB 114). The bill requires the director of administrative services publish in the form of a model act for use by counties, townships, municipal corporations, or any other political subdivision described in division (B) of section 125.04 of the Revised Code, a system of preferences for products mined and produced in this state and in the United States and for Ohio-based contractors.	Price preference	Government Procurement	Global Trade Alert (20 January 2014)
	2011	The Department of Energy (DOE) had argued that the cargo preference law did not apply to the DOE's loan guarantee program. The Cargo Preference Act of 1954 requires that US government-financed cargoes be shipped on US flag vessels, provided that such vessels are available at fair and reasonable rates. Preference cargoes are the single most important incentive for US flag operators in the international trades to remain under US registry for international routes. Threatening litigation, the Department of Transportation successfully insisted that the requirements be enforced.	Price preference	Government Procurement	Peterson (2013)
	2011	Under Assembly Bill No. 1097, the California Legislature amended the Government Code to allow the state or local agency (with reference to the use of Federal funds for transit purposes) to apply a bidding preference to a domestic bidder, the requirement may exceed the Buy America requirements applicable to federally funded transit projects.	Price preference	Government Procurement	California Legislative Information website

Country	Year	Description	Benefit	Targeted market	Source
United States *(cont.)*	2011	The Department of Defense and Full-Year Continuing Appropriations Act of 2011 provided procurement funding to US agencies with Buy America requirements	Market Access	Government Procurement	Government Publishing Office
	2012	The US Congress reauthorized regulations requiring that at least 75% of the voting rights in a US airline carrier must be owned by US citizens when it passed the Continuing Appropriations Act of 2012 (Public Law 112-33). This investment restriction was first passed under the Merchant Marine Act of 1920 (also known as the Jones Act) but was set to expire under current law prior to the extension under the Appropriations Act of 2012.	Market access	Ownership / Partnership	Peterson (2013)
	2012	The Ohio code, Title 1, Chapter 153, Section 153.011 was amended in 2012 to require that any building, structure (including highway improvements), funded at least in part by state capital funds, must use steel products made in the United States	Market Access	Government Procurement	Ohio Laws and Rules website
	2012	The Consolidated and Further Continuing Appropriations Act of 2012 provided procurement funding to US agencies with Buy America requirements	Market Access	Government Procurement	Government Publishing Office
	2012	The Pennsylvania Steel Products Procurement Act was last amended in October 2012 and required every public agency shall use domestic steel for the construction, reconstruction, alteration, repair, improvement or maintenance of public works.	Market Access	Government Procurement	Pennsylvania Department of General Services website
	2012	The 'Moving Ahead for Progress in the 21st Century Act' or 'MAP-21' was passed in July 2012. It authorised funds for Federal-aid highways, highway safety programs, and transit programs, and for other purposes. The Act required funding to meet 'Buy America' requirements	Market Access	Government Procurement	Government Publishing Office
	2013	Governor Martin O'Malley of the state of Maryland signed into law on 16 May 2013 a 'Buy American' bill that will take effect on 1 October 2013. The "Purchase of American Manufactured Goods" bill (Senate Bill 47/House Bill 191) institutes a government-procurement preference for US manufactured goods. More precisely, it states that, unless the standards for certain exemptions are met, a public body shall require a contractor or subcontractor to use or supply American manufactured goods in the performance of a contract. The bill provides for certain exceptions. The requirements may be waived if a public agency determines that: (1) the price discrepancy between an American manufactured good and a similar foreign manufactured good is unreasonably high; (2) the American manufactured good is not available in sufficient quantities; (3) the quality of the American manufactured good is substantially less than the foreign manufactured good; or (4) the procurement of the American manufactured good is inconsistent with the public interest. Some state offices, such as the state higher-education facilities, are exempt from the law.	Market access	Government Procurement	Global Trade Alert (20 January 2014)

Country	Year	Description	Benefit	Targeted market	Source
United States *(cont.)*	2013	In a deal reached between by Senator Robert Menendez (Democrat of New Jersey), Chairman Larry Probst of the United States Olympic Committee (USOC), and USOC Chief Executive Officer Scott Blackmun, the USOC declared a strict "Buy American" policy for all future agreements with respect to uniforms to be worn by athletes during parade ceremonies that are part of the Olympic, Paralympic, and Pan-American Games. The new policy provides that, all uniforms provided by sponsors, partners, licensees, or suppliers for parade ceremonies shall be "Made in the USA" as defined by the standards of the Federal Trade Commission. The USOC committed to not changing the policy without first consulting with Congress, including the relevant Committees of Jurisdiction in the Senate and the House.	Market Access	Govern-ment Procure-ment	Global Trade Alert (20 Januar y 2014)
	2013	On 28 May 2013, Governor Rick Perry of the state of Texas signed into law a bill (HB 4) providing funding for water projects. One provision in the bill requires that contracts "include a requirement that iron and steel products and manufactured goods used in the project be produced in the United States." This requirement may be waived when products are not available in sufficient quantities, readily available, of a satisfactory quality, or "the use of such products or goods will increase the total cost of the project by more than 20%."	Market access	Govern-ment Procure-ment	Global Trade Alert (20 January 2014)
	2013	The US Congress is expected to introduce a new Buy American ammendment in mid-July. The provision will be attached to the 2013 funding bill for the US Environmental Protection Agency and, if passed, would apply to all water and wastewater projects encompassed under the bill, including those at the state level. More than USD 100 billion is currently available for related infrastructure initiatives; however, the amendment would require all projects use only US-made steel, iron and manufactured goods in the construction or maintenance process.	Market access	Govern-ment Procure-ment	Peterson (2013)
	2014	In January 2014, the US Government passed the Fiscal 2014 Omnibus Appropriations bill. The bill covers all 12 individual appropriations bills including the Interior and Environment Appropriations Bill, which contains a provision that would make the state revolving funds for drinking water and waste water subject to new Buy America restrictions. The legislation applies to a specific list of iron or steel products. The bill uses the House language that restricts the definition of iron and steel products to pipes, manhole covers, hydrants, tanks, and reinforced precast concrete and construction materials.	Market access	Govern-ment Procure-ment	US Congress (2014)
Uruguay	2010	The Uruguayan state electricity authority, La Administración Nacional de Usinas y Transmisiones Eléctricas (UTE), issued another tender in April for 150 MW of new wind capacity as part of an ongoing effort to promote wind energy development. The wind park tender has significant “local content” requirements, including a minimum of 20% equity participation by a local partner and 80% of subsequent maintenance work must be contracted locally.	Market Access	Ownership / Partner-ship	Bahar et al. (2013)

Country	Year	Description	Benefit	Targeted market	Source
Venezuela	2013	Beginning in 2013, domestically assembled vehicles are subject to a 50% local content requirement	Market Access	Inputs	USTR - 2013 National Trade Estimate Report on Foreign Trade Barriers
Viet Nam	2010	In 2010, Viet Nam introduced new legislation (Directive 494), restricting international bidding in government procurement to cases when domestic bidders cannot provide the necessary services or supplies. It also issued two lists of machinery, equipment, supplies and materials "which can be produced domestically" (Decision 2840/QD-BCT). These lists are to be used to discourage imports by limiting access to foreign currency and for selection in public tenders.	Market Access	Ownership / Partner-ship	EC Market Access Database
	2010	Prime Minister's Directive no. 494/CT-TTg dated 20 April 2010 on the use of domestic materials and goods in bidding of state-funded projects. It states that for bidding of goods procurement, international bidding shall be held only if domestic goods, materials and equipment cannot meet package requirements or those cannot be provided locally or sponsors of ODA package require of international bidding.	Market Access	Govern-ment Procure-ment	EC Tenth Report on Potentially Trade-Restrictive Measures
	2013	Starting 1 September 2013, Viet Nm's decrees 72 implements localization requirements mandating that all Internet service companies, such as Google or Facebook, operate at least one data centre in Viet Nam	Market access	Data residency	ITIF (2013)

1. A number of measures have been targeted at renewable energy and electric vehicles since the financial crisis. Detailed information on some of these measures is not readily available, however more in-depth analysis of those sectors can be found in Bahar et al. (2013) and Sims Gallagher et al. (2014).

2. This lists all of the identified LCRs that were applied between 2008 and 1 April 2014 and are in force, as such it may not be an exhaustive list of the LCRs currently in-force. The inclusion of the measures in this list is based on their expected effect, and is not at all related to the appropriateness of their stated policy objectives.

Annex B.

OECD Trade Model

The quantitative analysis employs the OECD Trade Model,[1] a computable general equilibrium model (CGE). As their name implies, CGE models require a complete specification of all economic activity and explicit recognition of inter-linkages. This approach is ideal for examining the whole of economy impact of a policy or other change.

The Model derives from the Social Accounting Matrix (SAM) based CGE model GLOBE developed by Scott McDonald, Karen Thierfelder and Terrie Walmsley (2013).[2] The model is a direct descendant of an early US Department of Agriculture model (Robinson et al., 1990) and NAFTA (Robinson et al., 1993) and follows trade principles deriving from the 1-2-3 model (de Melo and Robinson, 1989; Devarajan et al., 1990). The OECD SAM database derives from the GTAP V8 database (see Narayanan et al., 2012) and disaggregates imports based on use categories derived from OECD sources[3], as opposed to the widely applied proportionality assumption. The database consists of all 57 GTAP sectors and 56 regions, for the purpose of this study it is aggregated as displayed in Annex Table B1.

Annex Table B1. Data aggregation: Regions, sectors and factors

Region	Commodity/sector1	Factors
Argentina	Agriculture	Skilled labour
Brazil	Coal, oil, gas, mining	Unskilled labour
Indonesia	Food	Capital
India	Textiles	Land
Russia	Motor vehicles	Natural resources
United States	Electronic equipment	
Venezuela	Other manufacturing	
Kazakhstan	Water transport	
China (People's Republic of)	Other transport	
Rest of G204	Utilities	
Rest of the OECD5	Construction	
European Union	Insurance	
Rest of the World	Other services	

1. For the simulation on price preferences, additionally 'chemicals, rubber and plastic products' are distinguished in the sectoral dimension.

1. For a detailed model description refer to the 'OECD Trade Model Documentation' (TAD/TC/WP(2014)11).
2. The original model and a detailed documentation are available at http://www.cgemod.org.uk/.
3. Shares for manufacturing and agricultural sectors derive from data underlying OECD BTDIXE 2013ed. Data on services derive from the OECD Inter-Country Input-Output Model (May 2013)
4. Australia, Japan, Korea, Canada, Mexico, Saudi Arabia, Turkey, South Africa.
5. New Zealand, Chile, Switzerland, Norway, Israel.

The novelty and strength of the OECD Trade Model lies in the detailed trade structure and the differentiation of commodities by use – Commodities and thus trade flows are distinguished by use category (u) into commodities designed for intermediate use, use by households, government consumption as well as investment commodities.

Like GLOBE, the underlying approach for the multi-region model is the construction of a series of single country CGE models that are linked through trade relationships. As common in CGE models, the price system in the model is linear homogeneous, which directs the focus on relative, not absolute, price changes. Each region has its own numéraire, typically the Consumer Price Index (CPI), and a nominal exchange rate (an exchange rate index of reference regions serves as model numéraire). Thus, price effects inside a country are fed through the model as a change relative to the country's numéraire, and prices between regions change relative to the reference region. Finally, the Model contains a 'dummy' region to allow for inter-regional transactions where full bilateral information is not available, i.e. data on trade and transportation margins.

The model distinguishes activities which produce commodities. Activities maximise profits and form output from primary inputs (i.e. land, natural resources, labour and capital), combined using Constant Elasticity of Substitution (CES) technology, and intermediate inputs in fixed shares (Leontief technology). Households are assumed to maximise utility subject to a Stone-Geary utility function, which allows for the inclusion of a subsistence level of consumption. All commodity and activity taxes are expressed as ad valorem tax rates and taxes are the only income source to the government. Government consumption is in fixed proportions to its income and government savings are defined as a residual. Closure rules for the government account allow for various fiscal specifications.[6] Total savings consist of savings from households, the internal balance on the government account and the external balance on the trade account. The external balance is defined as the difference between total exports and total imports in domestic currency units. While income to the capital account is defined by several savings sources, expenditures by the capital account are based solely on commodity demand for investment.

Trade relationships of agents within a region are implemented using a standard approach as applied in the GLOBE model. For the modelling of LCRs which are typically targeted on the imported input use of an activity and not on the commodity side, an alternate import structure is developed. The alternate intermediate nesting identifies activity specific imports and domestic supply and basically shifts the composite of domestic and imported goods directly at the activity level.

The LCR-module

In addition, the Model is augmented with a measure to capture Local Content Requirements (LCRs) as a quantitative measure. Many LCRs are defined as a percentage share of base supply and are assumed to affect imports only when local content is beneath that share, making the specific LCR binding. The underlying assumption is that the company's observed intermediate input use is based on optimal allocation at given prices. It will change this input allocation only if prices change or it is required to because of the LCR policy. As long as a company is already fulfilling the LCR, it is not binding. For example if the current domestic content in inputs is 60% and the relating LCR is 50%, there will be no need to adjust the

6. The default assumption for the government account is a fixed internal balance and fixed government expenditures, i.e. the volume of government expenditures is fixed. The income tax is variable to clear the government account. Similarly, each of the other tax rates could be set free to balance the government account. Alternatively to the volume of government demand, the government share of final demand or the value of government expenditure could be fixed. Another setting could assume, e.g. a flexible internal balance and fixed tax rates.

composition of imported and domestically produced intermediate inputs. When the LCR becomes binding – for example if the current domestic content in inputs is 40% and the relating LCR is 50% – the company must reduce its imports use and increase inputs sourced from domestic production to a minimum of 50%.

To capture this reality of LCR policy, we model domestically produced supply (QD) in two components, Annex Figure B1 displays the structure of the LCR module. The first component is the quantity which would be supplied without the LCR (QD^{NL}) (in the base situation the 40% in the example). The second component is the quantity which is additionally needed to fulfil the LCR (QD^{LCR}) (10%).

$$QD = QD^{LCR} + QD^{NL} \tag{1}$$

As noted above if domestic sources meet or surpass the LCR, QD = QD^{NL}.

Total supply is likewise broken into two components, the quantity which is supplied through competition (QQ^{ARM}) between imports (QM) and domestically produced commodities, and the additional quantity of domestic supply to fulfil the LCR.

$$QQ = QD^{LCR} + QQ^{ARM} \tag{2}$$

The share going to fill the LCR is cut out prior to the Armington function, because this part of the domestic supply must be supplied domestically irrespective of the relative prices and thus is not in competition to imports. If an LCR is binding, a part of total supply is now supplied through the LCR channel, which decreases the demand of goods supplied through the Armington nest. Relative prices adjust leading to changes in the mix of competitively supplied imports and domestic quantities. As the competitive domestic supply and total supply are subject to change, the additional LCR quantity is also variable and defines the additional domestic supply necessary to fulfil the LCR in the new equilibrium.

The Armington equation (Equation 3) gives the total supply (from imports and domestic sources) under a competitive market. It is an aggregate of the domestic production that is supplied without the LCR (QD^{NL}) and aggregate imports (QM), where δ is a share parameter, ρ the elasticity parameter and α a shift parameter:

$$\mathrm{QQARM_{c,r}} = \alpha * \left[\delta * \mathrm{QM}^{-\rho} + (1-\delta) * \mathrm{QD}^{\mathrm{NL}^{-\rho}}\right]^{-1/\rho} \tag{3}$$

The optimal combination of imports and domestic supply is determined by the first order condition to minimise costs and depends on the relative prices of imports (PM) to domestic commodities (PD). Domestic supplied commodities are assumed homogeneous, irrespective of the channel through which they are supplied.

$$\mathrm{QM} = \mathrm{QD}^{\mathrm{NL}} * \left[\frac{\mathrm{PD}}{\mathrm{PM}} * \frac{\delta}{1-\delta}\right]^{1/(1+\rho)} \tag{4}$$

The quantity of local content required (QLCR) is defined as the share (lcrsh) of the total supply in the base ($\overline{QQ}$). Where lcrsh is defined as the share of total supply which must be of local content and thus constitutes the policy parameter.

$$QLCR = \overline{QQ} * lcrsh \tag{5}$$

The LCR is implemented as Mixed Complimentary Problem (MCP), with a regime switch between the situation where the LCR is not binding and the situation where it becomes binding. When the LCR is binding, the market itself does not supply the required domestic production (through the market via the 'normal' Armington function, QD^{NL}), and an additional domestic

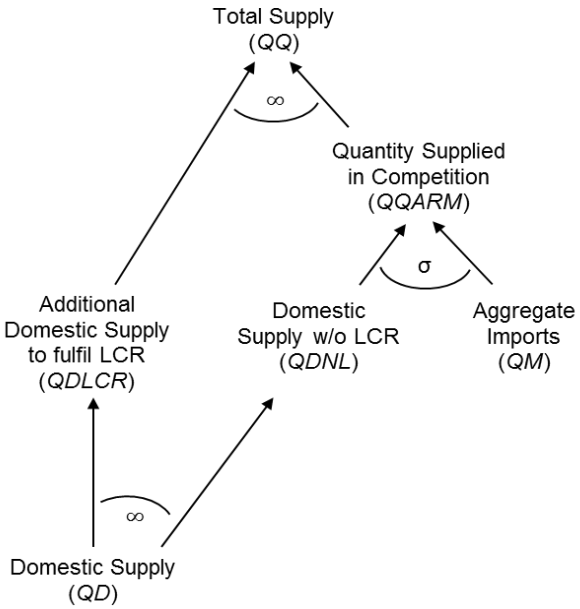
quantity needs to be supplied to fulfil the LCR which is QD^{LCR}. The quantity supplied domestically (QD) must always be greater or equal the quantity of local content required (QLCR), hence the slack variable (s) is by definition negative or zero. The slack variable reports the amount of domestic supplied quantity which is supplied in surplus to the LCR.

$$s = QLCR - QD \tag{6}$$

and

$$s \leq 0 \text{ with } QD^{LCR} \geq 0 \tag{7}$$

Figure 2. Annex Figure B1. The local content requirements module



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Annex C.

Individual results tables

Annex Table C1. Argentina reinsurance LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insurance													
Production	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.01	-0.01	0.00	-0.01	-0.01	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01
Imports	-34.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Services													
Production	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Business Servcies													
Production	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Communications													
Production	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recreation and Other Services													
Production	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trade													
Production	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport													
Production	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C2. Argentina mining transport LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Minerals													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport													
Production	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Transport Sector													
Production	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trade													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C3. Brazilian communications LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Communications													
Production	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	-5.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Business Servcies													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trade													
Production	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.01	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Services													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport													
Production	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical Equipment													
Production	-0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.05	-0.01	0.00	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	-0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.04	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	-0.05	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.08	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.03	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	-0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport Equipment													
Production	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C4. Brazilian motor vehicle LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	-0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.42	-0.54	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.02	-0.01
Exports	-0.28	-0.55	-0.01	0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01
PPI	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.13	-0.52	-0.01	-0.01	-0.01	0.00	-0.02	-0.01	0.00	-0.01	0.00	-0.01	0.00
Motor Vehicles													
Production	-3.70	3.92	-0.10	-0.02	-0.01	-0.04	0.03	-0.01	-0.01	-0.09	-0.28	-0.10	-0.06
Production Cost	-0.20	-0.07	0.00	0.00	0.00	0.00	-0.05	0.01	0.00	0.01	0.00	0.01	0.00
Exports	-6.35	2.35	-0.34	-0.17	-0.03	-0.22	0.05	-0.01	-0.09	-0.13	-0.64	-0.15	-0.17
Imports	-3.39	-28.99	-0.09	-0.01	-0.01	-0.04	0.18	-0.01	-0.03	-0.07	-0.26	-0.10	-0.04
Labour Demand	-3.93	3.83	-0.10	-0.02	-0.01	-0.04	-0.03	0.00	-0.01	-0.08	-0.28	-0.09	-0.06
Other Manufacturing													
Production	0.13	0.00	0.00	0.00	-0.01	0.00	0.00	-0.01	0.00	0.00	0.01	0.00	0.00
Production Cost	0.05	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.50	-0.98	0.00	0.01	-0.01	0.02	-0.01	-0.01	0.00	0.01	0.01	0.01	0.00
Imports	-0.16	0.99	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.01	0.00	-0.01	0.00
Labour Demand	0.19	-0.06	0.00	0.00	-0.01	0.00	0.00	-0.01	0.00	0.00	0.01	0.00	0.00
Trade													
Production	-0.04	0.19	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	0.00
Production Cost	-0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.15	-0.52	0.00	0.00	-0.01	0.01	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.01
Imports	-0.28	2.36	0.00	0.00	0.00	-0.01	0.02	0.01	-0.01	-0.02	0.00	-0.01	-0.01
Labour Demand	-0.08	0.20	0.00	0.00	-0.01	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.01
Other Business Servcies													
Production	0.01	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	-0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.20	-0.66	0.00	0.02	-0.01	0.00	-0.01	0.02	0.00	0.01	0.00	0.01	0.01
Imports	-0.27	1.45	0.00	0.01	0.00	-0.01	0.03	0.00	-0.01	-0.01	0.00	-0.01	0.00
Labour Demand	-0.01	0.08	0.00	0.01	-0.01	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00
Other Transport													
Production	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01
Production Cost	-0.01	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.18	-0.49	-0.01	-0.01	-0.01	0.00	0.00	-0.01	0.00	0.00	-0.01	0.00	-0.01
Imports	-0.19	2.08	0.00	0.01	0.00	-0.02	0.05	0.00	-0.01	-0.01	-0.01	-0.01	-0.01
Labour Demand	-0.01	0.09	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01
Machinery and Equipment													
Production	-0.03	0.61	-0.03	-0.01	-0.01	-0.01	-0.02	-0.01	-0.01	0.00	-0.03	-0.01	-0.02
Production Cost	0.02	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.11	-0.33	-0.04	-0.04	-0.03	-0.02	0.00	-0.01	-0.01	0.00	-0.03	-0.01	-0.03
Imports	-0.16	2.78	-0.03	0.00	0.00	-0.01	0.00	-0.01	-0.01	0.00	-0.03	-0.01	-0.02
Labour Demand	0.00	0.52	-0.04	-0.01	-0.02	-0.01	-0.02	-0.01	-0.01	0.00	-0.03	-0.01	-0.03
Electrical Equipment													
Production	-0.14	0.35	-0.03	-0.01	-0.02	-0.01	0.05	-0.01	-0.02	0.00	-0.02	0.01	-0.03
Production Cost	0.03	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.01	-1.10	-0.04	-0.03	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.03	0.01	-0.03
Imports	-0.30	1.97	-0.02	0.00	-0.01	-0.01	0.04	0.00	-0.01	-0.01	-0.02	0.00	-0.02
Labour Demand	-0.11	0.25	-0.03	-0.01	-0.03	0.00	0.05	-0.01	-0.01	0.00	-0.02	0.00	-0.03
Other Services													
Production	-0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	-0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.15	-0.63	0.00	-0.01	-0.01	0.01	-0.01	0.00	0.00	0.00	-0.01	0.00	0.00
Imports	-0.25	0.94	0.00	0.00	0.00	-0.01	0.01	0.00	-0.01	-0.01	0.00	-0.01	0.00
Labour Demand	-0.03	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Communications													
Production	-0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	0.00
Production Cost	-0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.18	-0.60	-0.01	-0.01	-0.02	0.00	-0.02	-0.01	0.00	0.00	-0.01	0.00	-0.01
Imports	-0.17	1.21	0.00	0.01	0.00	-0.01	0.01	0.01	0.00	-0.01	0.00	-0.01	0.00
Labour Demand	-0.05	0.18	-0.01	0.00	-0.01	0.00	0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.01

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C5. Indian electricity LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	-0.37	-0.02	0.01	-0.02	-0.01	0.00	0.00	0.00	0.00	-0.01
Exports	0.00	0.00	0.01	-0.65	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
PPI	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	0.00	-0.28	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Electricity													
Production	0.00	0.00	0.01	-0.25	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01
Production Cost	0.00	0.00	-0.01	0.33	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
Exports	0.01	-0.01	0.02	-0.28	0.03	0.02	0.04	0.03	0.00	0.02	0.00	0.00	0.03
Imports	0.05	0.01	0.00	-48.83	0.00	0.03	-0.02	0.01	0.02	0.02	0.01	0.02	0.00
Labour Demand	0.00	0.00	0.00	0.16	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.01
Coal, Oil and Gas													
Production	-0.01	-0.03	-0.03	3.42	-0.01	-0.02	-0.01	-0.01	-0.03	-0.03	-0.02	-0.03	-0.03
Production Cost	-0.01	-0.02	-0.03	2.72	-0.01	-0.03	-0.02	-0.02	-0.02	-0.04	-0.03	-0.03	-0.04
Exports	-0.11	-0.08	-0.06	0.03	-0.05	-0.06	-0.03	-0.02	-0.09	-0.06	-0.03	-0.05	-0.06
Imports	-0.01	-0.04	-0.04	4.98	-0.03	-0.02	-0.04	-0.03	-0.01	-0.04	-0.03	-0.04	-0.04
Labour Demand	-0.01	-0.04	-0.04	4.06	-0.01	-0.03	-0.01	-0.02	-0.03	-0.04	-0.03	-0.04	-0.04
Other Manufacturing													
Production	0.01	0.01	0.02	-0.28	0.03	0.01	0.03	0.04	0.00	0.02	0.01	0.00	0.04
Production Cost	0.00	0.00	-0.01	0.02	-0.01	-0.01	0.00	-0.01	0.00	-0.01	0.00	0.00	-0.01
Exports	0.01	0.00	0.03	-0.83	0.05	0.02	0.06	0.06	0.00	0.03	0.02	0.01	0.05
Imports	0.01	0.02	0.02	1.88	0.01	0.03	0.00	0.03	0.00	0.01	0.01	0.01	0.02
Labour Demand	0.00	0.00	0.01	-0.25	0.02	0.00	0.02	0.03	0.00	0.01	0.01	0.00	0.03
Trade													
Production	0.00	0.00	0.01	-0.11	0.00	0.01	0.00	-0.01	0.00	0.01	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.01	-0.40	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Imports	0.00	-0.01	-0.01	0.88	-0.02	0.00	-0.02	0.00	-0.01	0.00	0.00	0.00	-0.01
Labour Demand	0.00	0.00	0.01	-0.14	0.00	0.01	0.00	-0.01	0.00	0.01	0.00	0.00	0.00
Other Transport													
Production	0.00	0.00	0.01	-0.12	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.01	-0.41	0.02	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01
Imports	0.00	-0.01	0.00	0.67	-0.01	0.00	-0.02	-0.02	0.00	0.00	0.00	0.00	-0.02
Labour Demand	0.00	0.00	0.01	-0.16	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Other Services													
Production	0.00	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.01	-0.41	0.02	0.01	0.02	0.01	0.00	0.01	0.01	0.01	0.01
Imports	0.01	-0.02	-0.01	0.50	-0.02	-0.01	-0.03	-0.01	0.00	0.00	-0.01	0.00	-0.02
Labour Demand	0.00	0.00	0.00	-0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	0.00	0.00	-0.01	0.37	0.02	0.00	0.03	0.03	-0.01	0.00	-0.01	-0.01	0.00
Production Cost	0.00	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.01	-0.01	-0.01	-0.12	0.01	-0.02	0.00	0.03	-0.02	0.00	-0.01	-0.02	0.00
Imports	0.00	-0.01	-0.01	1.27	-0.01	0.00	0.01	0.02	0.00	0.00	-0.01	-0.01	-0.01
Labour Demand	0.00	-0.01	-0.01	0.29	0.01	0.00	0.03	0.03	0.00	0.00	-0.01	-0.01	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.01	-0.35	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Imports	0.00	-0.01	-0.01	0.61	-0.02	0.00	-0.03	-0.02	0.00	-0.01	0.00	0.00	-0.02
Labour Demand	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Communications													
Production	0.00	0.00	0.01	-0.16	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.01	-0.41	0.02	0.01	0.02	0.02	0.00	0.01	0.01	0.01	0.01
Imports	-0.09	-0.02	0.02	0.33	-0.01	0.00	-0.10	-0.03	0.00	0.00	-0.01	0.00	-0.01
Labour Demand	0.00	0.00	0.01	-0.21	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C6. Kazakhstan food LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	0.00
Agriculture													
Production	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	-0.01	-0.05	0.00	0.00	-0.06	-0.01	0.00	0.00	0.00	-0.01
Imports	0.00	0.00	-0.03	0.00	-0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.17	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00
Other Transport													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	-0.01	0.00	0.01	-0.32	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.03	0.00	0.00	-0.21	0.00	0.00	0.00	0.00	0.00
Imports	-0.01	0.00	0.00	0.00	0.00	0.00	0.01	-0.02	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.09	0.00	0.00	0.00	0.00	0.00
Other Business Servcies													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
Imports	0.01	-0.01	0.01	0.00	-0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.06	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Food Products													
Production	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.39	0.00	0.00	1.10	-0.01	0.00	0.00	0.00	-0.01
Imports	-0.01	0.00	0.00	0.00	-0.01	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C7. Kazakhstan subsoil LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.20	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.18	0.00	0.00	0.00	0.00	0.00
Coal, Oil and Gas													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.16	0.00	0.00	0.00	0.00	0.00
Exports	0.01	0.01	0.00	0.00	0.00	0.01	0.00	-0.12	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.01	-0.03	-0.01	0.00	0.00	0.00	-7.58	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.14	0.00	0.00	0.00	0.00	0.00
Other Minerals													
Production	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.09	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00
Imports	0.02	0.00	0.02	0.03	0.01	0.00	0.10	-2.67	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.11	0.00	0.00	0.00	0.00	0.00
Other Business Servcies													
Production	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	1.57	0.00	0.00	0.00	0.00	-0.01
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00
Exports	-0.02	-0.02	0.00	-0.02	-0.02	-0.02	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02
Imports	0.01	-0.01	0.01	-0.01	0.00	0.00	0.02	3.36	0.00	0.00	0.00	0.00	-0.01
Labour Demand	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	1.52	0.00	0.00	0.00	0.00	-0.01
Other Transport													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.12	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.67	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Exports	0.01	0.00	0.01	0.01	0.01	0.01	0.00	-0.02	0.01	0.01	0.01	0.01	0.01
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
Other Services													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.14	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	0.00	-0.01	0.00	0.00	0.02	1.06	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.17	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.41	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.22	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C8. Russian Federation communication LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Communications													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.09	0.00	0.02	-0.01	-9.25	0.00	-0.10	0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.05	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.02	0.00	-0.01	0.00	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Business Servcies													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	-0.01	0.01	0.00	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Services													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	0.00	-0.01	0.05	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.05	0.00	0.01	-0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	0.00	0.00	0.00	0.00	0.12	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	-0.01
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.05	0.00	0.00	-0.17	0.00	0.00	0.00	0.00	-0.01
Imports	-0.01	0.00	0.00	0.00	0.20	0.00	0.01	-0.04	0.00	0.00	0.00	0.00	-0.01
Labour Demand	0.00	0.00	0.00	0.00	0.12	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	-0.01
Trade													
Production	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Vehicles													
Production	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.01	0.01	0.02	0.00	0.01	-0.30	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport Equipment													
Production	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	-0.01	0.00	0.04	0.00	0.13	-0.04	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical Equipment													
Production	0.00	0.00	0.00	0.00	0.39	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.01	0.00	0.03	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00
Imports	0.02	0.00	-0.01	-0.01	0.45	0.00	-1.91	-0.05	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.38	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C9. Russian Federation motor vehicle LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.05	0.00	-0.01	-0.01	-0.01	0.00
Imports	0.00	-0.01	-0.01	-0.01	-0.37	-0.03	0.02	0.08	-0.02	-0.05	-0.01	-0.03	0.00
Exports	-0.01	-0.01	-0.01	0.00	-0.24	-0.01	0.00	0.00	-0.01	-0.04	-0.02	-0.02	-0.01
PPI	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Exchange rate	-0.03	-0.02	-0.02	-0.01	-0.49	-0.01	-0.04	-0.09	-0.02	-0.02	-0.01	-0.02	0.00
Motor Vehicles													
Production	-0.02	-0.02	-0.17	-0.10	19.20	-0.05	-0.02	16.94	-0.06	-0.35	-0.04	-0.19	-0.24
Production Cost	0.01	0.01	0.01	-0.02	2.39	0.02	0.01	-6.84	0.02	0.04	0.01	0.02	-0.11
Exports	-0.03	-0.07	-0.58	-0.38	29.75	-0.18	-0.10	16.12	-0.47	-0.54	-0.10	-0.29	-0.82
Imports	-0.02	-0.05	-0.16	0.02	-26.15	-0.06	-0.03	19.29	-0.08	-0.30	-0.04	-0.19	0.04
Labour Demand	-0.01	-0.01	-0.16	-0.12	22.80	-0.02	-0.01	6.96	-0.04	-0.30	-0.03	-0.16	-0.38
Other Manufacturing													
Production	-0.01	-0.01	-0.02	0.00	-0.13	-0.01	-0.03	0.14	-0.01	-0.01	-0.02	0.00	-0.01
Production Cost	0.00	0.00	0.01	0.01	-0.14	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01
Exports	-0.01	-0.01	-0.02	0.01	-0.77	0.00	-0.05	0.05	0.01	0.03	-0.02	0.01	-0.01
Imports	0.00	-0.02	-0.02	-0.02	0.58	-0.04	0.00	0.12	-0.03	-0.04	-0.03	-0.02	-0.02
Labour Demand	0.00	0.00	-0.01	0.01	-0.31	0.00	-0.02	0.14	0.00	0.00	-0.02	0.01	0.01
Trade													
Production	0.00	0.00	-0.01	-0.01	0.15	-0.01	0.00	0.16	-0.01	-0.02	-0.01	-0.01	0.00
Production Cost	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.02	-0.01	-0.01	0.00	-0.41	-0.01	-0.01	0.00	-0.01	0.01	-0.02	-0.01	-0.01
Imports	0.02	-0.01	-0.01	-0.02	1.19	-0.03	0.02	0.12	-0.02	-0.05	-0.01	-0.02	0.03
Labour Demand	0.00	0.00	-0.01	-0.01	0.09	-0.01	0.00	0.17	-0.01	-0.02	-0.01	-0.02	0.00
Electricity													
Production	0.00	0.00	-0.01	-0.01	0.17	-0.02	-0.01	0.15	-0.01	-0.01	-0.01	-0.01	0.00
Production Cost	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01
Exports	-0.03	0.03	0.01	-0.05	-0.55	0.03	-0.03	0.00	0.03	0.03	0.01	0.03	0.02
Imports	-0.01	-0.01	-0.02	-0.04	0.88	-0.05	0.04	0.19	-0.03	-0.05	-0.02	-0.04	-0.02
Labour Demand	0.00	0.00	-0.01	0.00	0.04	-0.01	-0.01	0.16	0.00	-0.01	-0.01	0.00	0.01
Other Business Services													
Production	0.00	-0.01	-0.01	0.00	0.15	-0.01	0.00	0.09	-0.01	-0.02	-0.01	-0.01	0.00
Production Cost	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.02	-0.02	0.00	0.00	-0.41	0.00	0.00	-0.01	-0.01	0.01	-0.02	0.01	0.00
Imports	0.01	-0.01	0.01	-0.01	0.90	-0.02	0.03	0.17	-0.01	-0.05	-0.01	-0.02	0.01
Labour Demand	0.00	-0.01	-0.01	0.00	0.12	-0.01	0.00	0.10	-0.01	-0.02	-0.01	-0.02	0.00
Electrical Equipment													
Production	-0.02	-0.01	-0.03	0.00	1.08	-0.01	-0.02	0.04	-0.01	0.03	-0.04	0.01	-0.05
Production Cost	0.00	0.00	0.00	0.00	-0.08	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Exports	-0.02	-0.03	-0.03	0.00	-0.55	-0.01	-0.01	0.79	-0.01	0.05	-0.04	0.02	-0.06
Imports	-0.02	0.00	-0.02	-0.02	1.62	-0.02	-1.91	0.12	-0.01	-0.01	-0.03	0.01	-0.04
Labour Demand	-0.02	-0.01	-0.03	0.00	0.98	-0.01	-0.03	0.05	-0.02	0.03	-0.04	0.01	-0.06
Machinery and Equipment													
Production	-0.03	-0.03	-0.05	0.00	-0.27	-0.01	-0.04	0.28	-0.02	0.04	-0.05	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	-0.11	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
Exports	-0.04	-0.05	-0.05	-0.01	-1.13	0.00	-0.01	0.49	-0.02	0.06	-0.05	0.01	0.00
Imports	-0.03	-0.02	-0.04	-0.01	0.66	-0.02	0.00	0.25	-0.02	0.00	-0.04	-0.01	0.01
Labour Demand	-0.03	-0.02	-0.05	0.00	-0.41	-0.01	-0.04	0.24	-0.02	0.04	-0.05	0.00	-0.01

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C10. Venezuelan motor vehicle LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00
Motor Vehicles													
Production	-0.04	-0.02	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.00	-0.01	0.00	-0.01
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.06	-0.05	0.00	0.00	0.00	-0.01	0.13	0.00	0.00	-0.01	-0.02	0.00	-0.03
Imports	-0.03	-0.01	0.01	0.01	0.00	0.00	-2.54	-0.30	0.00	0.00	-0.01	0.00	-0.01
Labour Demand	-0.04	-0.01	0.00	0.00	0.00	0.00	1.16	0.00	0.00	0.00	-0.01	0.00	-0.01
Trade													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.02	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Other Manufacturing													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00
Other Services													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Electrical Equipment													
Production	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	-0.01	0.01	0.00	-1.91	-0.05	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00
Other Business Servcies													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	-0.02	0.01	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex Table C11. Impact of Indonesian Water Transport LCR

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
GDP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PPI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unemployment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange rate	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Transport Sector													
Production	-0.05	-0.02	2.56	-0.01	-0.02	-0.01	-0.01	0.00	0.00	-0.02	-0.05	-0.07	-0.07
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	-0.08	-0.05	1.90	-0.01	-0.05	-0.03	-0.02	-0.15	-0.01	-0.02	-0.05	-0.07	-0.10
Imports	-0.56	-0.02	2.69	-0.01	0.01	-0.01	-0.07	-0.02	0.00	-0.02	-0.05	-0.07	-0.07
Labour Demand	-0.05	-0.02	2.55	-0.01	-0.02	-0.01	-0.01	0.00	0.00	-0.02	-0.05	-0.07	-0.07
Other Manufacturing													
Production	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	-0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Food Products													
Production	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	-0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Vehicles													
Production	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.01	0.00	-0.96	0.01	0.00	0.00	0.01	-0.30	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Transport Equipment													
Production	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	-0.98	0.00	-0.01	0.00	0.13	-0.04	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Services													
Production	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.01	0.00	-0.13	-0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction													
Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	-0.02	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles													
Production	0.00	0.00	-0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.01	-0.01	-0.18	0.00	0.00	0.00	-0.02	-0.02	0.00	0.00	0.01	0.00	0.00
Labour Demand	0.00	0.00	-0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trade													
Production	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Equipment													
Production	0.00	0.00	-0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.00	0.00	-0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports	-0.01	0.00	-0.29	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00	0.00	0.00
Labour Demand	0.00	0.00	-0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: For the individual sector results exports refer to the commodity exports of the sector and imports refer to total intermediate commodities imported to that sector.

Annex D

Sensitivity Analysis

Standard closure employed

Foreign exchange market: In the standard closure, the current account balance is fixed and the exchange rate is floating. The exchange rate index for the reference regions ('rest of G20') serves as world numeraire and the region specific consumer price index as regional numeraire. In the capital market the model setup follows the Keynesian approach with investment driven savings, so that the value of investment remains a fixed share of final demand and the savings rate adjusts. The regional governments are assumed to maintain the fixed level of spending and the income tax rates adjust to maintain the balance. In the factor market capital, land and natural resources are fully employed and mobile across sectors. Labour is assumed mobile across sectors and there is unemployment, applying unemployment rates of the World Bank for 2008, hence wage rates are fixed until full employment is reached.

Closure sensitivity

Model outcomes are tested with different closure assumptions which are variations from the standard closure. Annex Table D1 shows the results of the sensitivity analysis. The first closure variant assumes full employment, all other market conditions kept equal to the standard closure. With full employment factor supply is fixed and wages can adjust. Overall the effects, positive and negative, are smaller compared to unemployment. Annex Table D1 shows that real GDP effects in Brazil, India and Kazakhstan are mainly influenced by the labour market. Trade effects are little affected by the unemployment assumption.

Annex Table D1. Macroeconomic results with varying closure setups

	Argentina	Brazil	Indonesia	India	Russia	United States	Venezuela	Kazakhstan	China (People's Republic of)	Rest of G20	Rest of OECD	European Union	Rest of World
	% change real GDP												
base: unemployment	-0.02	0.09	0.00	-0.06	0.01	-0.01	0.02	0.39	-0.01	-0.01	-0.01	-0.01	0.00
variant 1: full employment	-0.01	0.01	0.00	-0.01	-0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
variant 2: fix exchange rate	0.00	0.00	0.00	-0.01	-0.03	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00
variant 3: flexible internal balance	-0.01	0.01	0.00	-0.01	-0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
	% change imports												
base: unemployment	-0.45	-0.57	-0.11	-0.38	-0.42	-0.04	-0.08	-0.43	-0.03	-0.07	-0.02	-0.05	-0.02
variant 1: full employment	-0.45	-0.61	-0.11	-0.36	-0.43	-0.03	-0.08	-0.68	-0.03	-0.06	-0.01	-0.04	-0.02
variant 2: fix exchange rate	-0.23	-1.40	-0.18	-0.61	-1.23	0.00	-0.11	-0.23	-0.01	-0.01	0.00	-0.01	0.01
variant 3: flexible internal balance	-0.45	-0.61	-0.11	-0.36	-0.43	-0.03	-0.08	-0.68	-0.03	-0.06	-0.01	-0.04	-0.02
	% change exports												
base: unemployment	-0.32	-0.58	-0.13	-0.66	-0.27	-0.03	-0.06	-0.52	-0.02	-0.05	-0.02	-0.04	-0.02
variant 1: full employment	-0.32	-0.63	-0.13	-0.62	-0.28	-0.02	-0.06	-0.82	-0.02	-0.04	-0.02	-0.03	-0.02
variant 2: fix exchange rate	-0.62	0.39	-0.02	-0.15	0.45	-0.05	-0.02	-0.95	-0.03	-0.11	-0.03	-0.06	-0.03
variant 3: flexible internal balance	-0.32	-0.63	-0.13	-0.62	-0.28	-0.02	-0.06	-0.82	-0.02	-0.04	-0.02	-0.03	-0.02

The second closure variant assumes a fixed exchange rate regime and a variable current account balance with full employment. The comparison of closure variant 1 and closure variant 2 shows very small effects on GDP, except for Kazakhstan. Unsurprisingly the foreign exchange closure setup affects results for trade flows: generally an appreciation, which most of the countries experience in the simulation, decreases export demand and increases import demand.

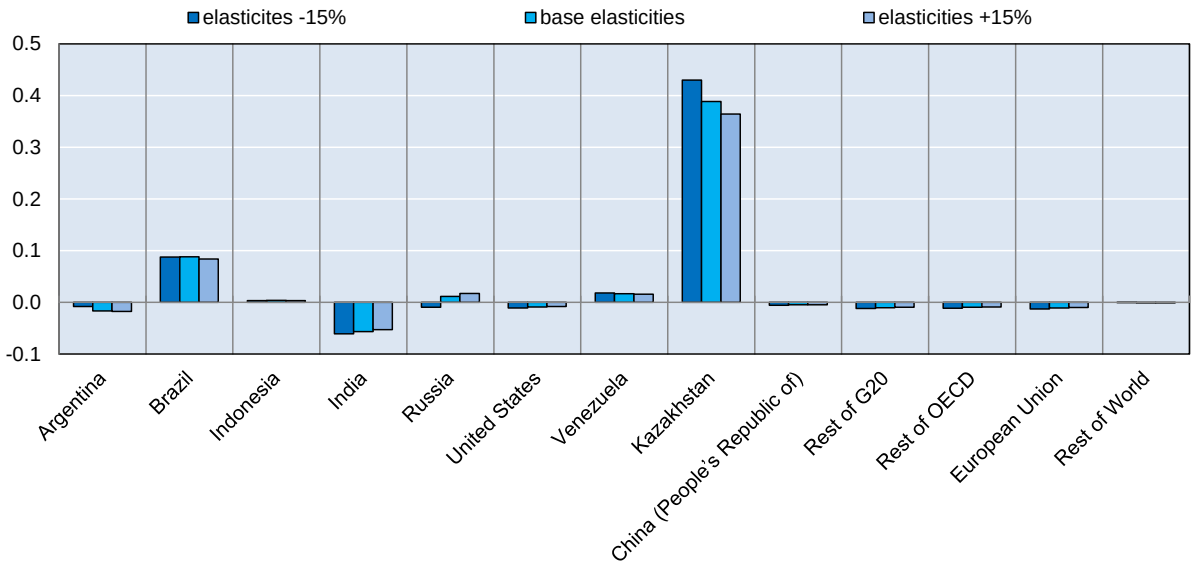
The third closure variant assumes fixed income and a variable internal balance for regional governments in combination with full employment. Comparing closure variant 1 and closure variant 3, this closure swap has no effects on model outcomes.

Elasticities and sensitivity

Key determinants to model outcomes are trade elasticities. Values for the different elasticities which are employed in the model are sourced from the GTAP database (Narayanan et al., 2012), which are based on academic literature. A sensitivity analysis shows smooth influence of the trade elasticities on model outcomes. As expected, trade effects are generally larger with more elastic trade elasticities and there are no sudden jumps. Figure 1 shows effects of 3 different elasticity setups on GDP results. For this purpose the simulation is run with the base elasticity values, a 15% reduction of this values and a 15% increase. Differences between the setups are small, the growth effect in Kazakhstan becomes smaller the more elastic the trade elasticities because of stronger decreasing trade.

Annex Figure D2. Sensitivity to Assumptions:

Elasticities



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Annex E.

Estimates of potential impact of GP LCR measures

This Annex explains the processes and sources used to estimate the potential impact of the GP measures in our database that are in-force, have a mandatory application, and relate to market access. These GP measures tend to either be aimed at all GP, at general economic sectors, or at the role of specific government ministries. Consistent and comparable GP statistics are scarce, and when available tend to be at the country level, rather than by sector. This means that statistics for GP in sectors or sub-sectors have to be found through an *ad hoc* approach of individual government or company reports, or news articles. The statistics reported are either based on the level of procurement in a given year, or the total amount of procurement for a specific policy.

The measures are in three groups: all of government purchasing, economic-sector specific, and ministry specific. Unless specifically cited, the information below was found in the sources underlying the measures database.

Government-wide measures

Cambodia - International bidding only permitted over tenders of USD 200 000

Cambodia implemented a law in 2012 that provided details on the eligibility of international bidding in government procurement. Bidding is restricted to local companies if the value is less than KHR 1 billion (USD 250 000) for goods, less than KHR 1.2 billion (approximately USD 300 000) for construction projects, or less than KHR 800 million (approximately USD 200 000) for services.

In response to a survey from the ADB, the Cambodian Government stated that its annual government procurement budget was between USD 410 million and USD 1 100 million.[1,2] Statistics on the number of tenders that exceed the international competition threshold are not available. This means that, while there will be a level of GP affected by this measure, due to a lack of information we are unable to provide an estimate.

Indonesia 1 - 40% LCR for all government procurement

In 2010, a Presidential regulation required a 40% LCR on the GP of all goods and services within Indonesia.[3]

1. This includes USD 200 million to USD 500 million in procurement under national and local budgets, USD 10 million to USD 100 million in procurement from State Owned Enterprises, and USD 200 million to USD 500 million in procurement funded through ODA donors.

2. Asian Development Bank (ADB), *Cambodia: Country Public Profile Survey (with E-Government Procurement Overview)*, (2011) available at: http://adbprocurementforum.net/?page_id=1523 (accessed 2 April 2014).

3. The Indonesian Government introduced two similar measures related to GP in 2009 and 2010. The 2009 measure was related to a list of 558 sub-sectors in which the Ministry of Industry announced domestic products were mandatory. While both measures range across all of the Indonesia's GP market, it is likely that the 2009 measure would be subsumed within the more recent LCR. Therefore, we focus on the 2010 measure, which has been used in evaluating the amount of affected government procurement.

The OECD provides estimates for the level of GP in 130 countries for 1998. That report estimates the size of the Indonesian GP market to be 9.2% of GDP.[4] The total size of the Indonesia GP market does not appear to have been estimated since. Given the dated nature of the OECD estimate, we adjust the level of Indonesian GP by the same percentage increase as the share of total government's expenditure in GDP between 1998 and 2008.[5] The adjusted size of the Indonesian GP market is 10.75% of GDP in 2008. Indonesia's GDP in 2008 was USD 510 839 million, of which 10.75% could be considered to be related to GP.[6,7] Applying the 40% LCR suggests that USD 21 960 million of GP has the potential to be affected by the implementation of the measure.

Kazakhstan - 20% LCR for all goods and 15% for all services in government procurement

In 2009 Kazakhstan modified its government procurement law to include a local content requirement. The level of local content was 15% for services and 20% for all goods purchased by the government.

The National Agency for Development of Local Content stated that the purchase of goods and services made by state authorities was USD 3 700 million in 2011.[8] A 20% LCR to this spending suggests that the maximum level of affected local content by this measure would be USD 740 million. The same article reports that the actual level of local content procured by the state was actually USD 1 300 million. This suggests that the LCR may not have a binding effect on the government procurement market in Kazakhstan.

Mexico - 65% LCR in federal procurement

In 2010, Mexico implemented new national content regulations for GP. The regulations required 65% of all GP to be locally sourced by 2012.[9] This LCR was only applicable for federal procurement, procurement at the Mexican state level was exempt.

The OECD estimates that the Mexican federal procurement market is valued at approximately 5% of GDP.[10] Mexico's GDP in 2008 was USD 1 100 673 million.[11] This suggests that the size of the

4. Audet, D. (2002) *The Size of Government Procurement Markets*, OECD Journal on Budgeting Vol 1, No.4, OECD, Paris, France.

5. The IMF World Economic Outlook Database shows that the government expenditure, as a percentage of GDP, increased by nearly 17% between 1998 and 2008, from 18.2% to 21.3%.

6. IMF, World Economic Outlook Database, October 2013, available at: www.imf.org/external/pubs/ft/weo/2013/02/weodata/index.aspx (accessed 27 March 2014)

7. The scale of the estimate of total procurement in Indonesia is supported by the Indonesian Government's response to a survey from the ADB, which was "Greater than USD 40 billion. ADB, *Indonesia: Country Public Profile Survey (with E-Government Procurement Overview)*, 2011, available at: http://adbprocurementforum.net/?page_id=1531 (accessed 2 April 2014).

8. Tengri News, *Kazakh content in public procurement dropped*, 15 February 2012, available at: en.tengrinews.kz/markets/Kazakh-content-in-public-procurement-dropped-7634/ (accessed 27 March 2014).

9. Some light manufacturers and automobiles were excluded from this regulation and instead were required to source 35% of their procurement locally.

10. OECD, *Size of public procurement market*, in Government at a Glance 2011, OECD Publishing. dx.doi.org/10.1787/gov_glance-2011-46-en

11. IMF, World Economic Outlook Database, October 2013, available at: www.imf.org/external/pubs/ft/weo/2013/02/weodata/index.aspx (accessed 27 March 2014).

federal procurement market was USD 55 034 million, with required local content of USD 33 020 million.

South Africa 1 - 30% LCR for State-Owned Enterprise procurement over USD 10 million

In 2010 South Africa merged its National Industrial Participation Programme (NIPP) with its Competitive Supplier Development Programmes (CSDP). The CSDP controls the contracting of South Africa's state-owned enterprises. The NIPP requires any public procurement over USD 10 million to include 30% local content.

The 2008 report of the NIPP lists the level of 'obliged' content involved in its current and expected projects into the future.[12] The level of local content in those projects is USD 16 135 million, which will be funded over multiple years.

Viet Nam - Foreign bidding in Viet Nam GP only accepted if domestic sources are unavailable

In 2010 the Prime Minister issued a directive stating that international bidding on government procurement should only be considered if domestic goods, materials, and equipment cannot meet requirements.

Government procurement in Viet Nam was 22% of GDP in 2010.[13] Viet Nam's GDP in 2008 was USD 98 269 million.[14] This LCR could potentially impact all of Viet Nam's GP which, when applying the 22% of GDP, would suggest that in 2008 the amount of affected GP was USD 21 619 million.

Economic sector-specific measures

India 1 - Electronic software and hardware with "security implications"

In 2012, the Indian Government put in place rules that required all government purchases of electronic software and hardware products with "security implications" to contain at 25% local content by 2012, increasing to 45% by the end of 2013.

The Indian Government were forecast to purchase USD 4 038 million of IT services, software, and hardware in 2012.[15] If all of these products were deemed to have "security implications" then all of that forecast procurement could be affected by the LCR.

South Africa 2 - Sub-sectors of GP reserved for domestic production

In 2011 the South African government implemented provisions that required GP in specific sectors to use only domestic content. These sectors included power pylons, railway rolling stock, buses (bus bodies), canned and processed vegetables, clothing and textiles, footwear and leather products, and television set top boxes. A second round of designations was announced in 2012, with

12. Department of Trade and Industry (DTI), *Human Impact: National Industrial Participation Programme, Report 2008*, 2008, Republic of South Africa.

13. Khorana, S, *Potential Accession to the GPD: Cost-Benefit Analysis Vietnam*, 2012. Paper presented at the 2012 5th International Public Procurement Conference.

14. IMF, World Economic Outlook Database, October 2013, available at: www.imf.org/external/pubs/ft/weo/2013/02/weodata/index.aspx (accessed 27 March 2014).

15. Gartner, Inc., *Gartner Says Indian Government to Spend 368 Billion Indian Rupees On IT In 2013*, Press Release, 4 February 2013, Gartner Inc. available at: www.gartner.com/newsroom/id/2324915 (accessed 28 March 2014).

pharmaceuticals, electrical cables and yellow cables, and office and school furniture. The LCRs in these additional sectors ranged from 35% to 100%.

Statistics on the level of procurement in these sub-sectors have proved difficult to source. As a result, the level of affected GP cannot be identified.

United States 1 - American Recovery and Reinvestment Act (ARRA)

In 2009 the United States enacted a USD 840 000 million stimulus bill.[16] This bill provided economic stimulus through tax benefits, entitlements, and contracts, grants, and loans. The bill included 'Buy America' provisions that required all of the iron, steel, and other manufactured goods used in the programme to be sourced locally.[17]

It should be noted that there are three exceptions to the Buy American provisions in the ARRA. These include:[18]

- Where applying the Buy America requirement would be inconsistent with the public interest;
- Where the iron, steel, and the relevant manufactured goods are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; and
- Where inclusion of iron, steel, and manufactured goods produced in the United States would increase the cost of the overall project by more than 25%.

Additionally, the language of the ARRA requires it to be applied in a manner consistent with the obligations of the United States in its international agreements, including the WTO Government Procurement Agreement and its bilateral agreements.

Of the USD 840 000 million allocated in the stimulus bill, USD 816 300 million has been distributed.[19] Excluding the funds distributed through tax benefits and entitlements leaves USD 261 200 million distributed through contracts, grants and loans. This amount could be considered as the amount of GP potentially affected by the LCR.

United States 2 - Buy American provisions in Maryland state procurement

In 2013 the state of Maryland implemented the "Purchase of American Manufactured Goods" bill, which included a Buy American provision. The bill forces all public bodies to require contracts

16. When enacted the bill allocated USD 787 000 million in stimulus, but this was subsequently increased.

17. Additionally, Section 604 of the law requires "funds appropriated or otherwise available to the Department of Homeland Security may not be used for the procurement of" certain covered items unless "grown, reprocessed, reused, or produced in the United States." The items covered by this provision include clothing and the materials and components thereof, other than sensors, electronics, or other items added to, and not normally associated with, clothing (and the materials and components thereof); tents, tarpaulins, covers, textile belts, bags, protective equipment (including but not limited to body armor), sleep systems, load carrying equipment (including but not limited to fieldpacks), textile marine equipment, parachutes, or bandages; cotton and other natural fiber products, woven silk or woven silk blends, spun silk yarn for cartridge cloth, synthetic fabric or coated synthetic fabric (including all textile fibers and yarns that are for use in such fabrics), canvas products, or wool (whether in the form of fiber or yarn or contained in fabrics, materials, or manufactured articles); or any item of individual equipment manufactured from or containing such fibers, yarns, fabrics, or materials.

18. Recovery Accountability and Transparency Board, The, *American Recovery and Reinvestment Act's Buy American mandate*, 2009, available at: recovery.gov.mp/wp-content/uploads/2010/06/ARRA-Buy_America_Overview1.pdf (accessed 28 March 2014).

19. Recovery Accountability and Transparency Board, The, *Recovery.gov/ARRA*, available at: www.recovery.gov/arra/Pages/default.aspx (accessed 28 March 2014).

and sub-contractors to use or supply American manufactured goods in their contracts, unless specific exceptions are met.

In 2008, Maryland entered into contracts worth USD 6 426m.[20] This entire spending could be potentially affected by the LCR.

United States 3 - Buy American provisions in water projects in Texas

In 2013 the state of Texas enacted legislation to provide funding for water projects. The legislation included a Buy American provision requiring all iron and steel products, and manufactured goods used in the projects to be produced in the United States. Similar exceptions as those in the ARRA were provided.

The legislation created a fund with appropriations of USD 2 000 million.[21] This entire appropriation could be affected by the LCR.

Ministry-specific measures

Argentina 1 - Fuel products for public cars, ships and planes to be sourced from domestic company

In 2012 the Argentinian Government issued a decree requiring that fuel and lubricants for all official cars, ships, and planes must be sourced from the government owned oil company, YPF. Statistics on the level of government spending on fuel and lubricants have been difficult to source, so the level of impacted procurement cannot be estimated.

Argentina 2 - Official air travel must be with domestic airlines

In 2012 the Argentinian Government issued a decree requiring that public officials must fly with domestic airlines, Aerolineas Argentinas, Ausral, and Lade, unless those companies do not offer a service on the route. Statistics on the level of government spending on air travel has been difficult to source, so the level of impacted procurement cannot be estimated.

India 2 - Railway safety technology products

In 2011 the Indian Government introduced an LCR for the GP of railway safety technology. No further details about the measure have been located.

The Indian Railways instituted a Corporate Safety Plan for Indian Railways between 2003 and 2013.[22] This plan was directed towards reducing the risk for passengers on Indian railways. The government allocated USD 6 402 million to the plan over its lifetime. Without further information about the measure, the entire level of procurement could potentially be affected.

20. Department of Legislative Services, *Maryland State personnel, Pensions, and Procurement: Legislative Handbook Series: Volume V 2010*, Library and Information Services, Office of Policy Analysis, Department of Legislative Services, Annapolis, Maryland.

21. Texas Legislative Council, *Analyses of Proposed Constitutional Amendments November 5, 2013, election*, 2013, Texas Legislative Council, Austin, Texas.

22. Comptroller and Auditor General of India (CAG), "Implementation of corporate safety plan in Indian Railways", in *Union Audit Reports: Performance Audit, Railways Report No.3 8 of 2010-11)*, 2011, Comptroller and Auditor General of India.

Indonesia 2 - LCR in procurement of defence equipment

Indonesia adopted a law in 2012 that would require 35% of the content involved in the production of defence equipment to be sourced locally in 2013. This LCR is set to increase to 85% by 2018.

In September and October 2012 the Indonesia Government committed USD 16 200 million to spend on defence equipment by 2014.[23] Assuming that the expenditure occurs equally across 2013 and 2014, and that the LCR increases in a straight-line between 2013 and 2018, then the level of GP affected by this measure would be USD 6 480 million by 2014.

Nigeria - Nigerian Armed Forces uniforms

In 2009 the Nigerian Government implemented a Buy-Made-In-Nigeria programme. This programme required all of the uniforms and boots of the Nigerian Armed Forces to be sourced locally.

The 2013 budget of the Federal Government included USD 7 million of uniform and other clothing purchases across the various armed services. This level of procurement would be impacted by the LCR measure.

United States 4 - Buy America clauses related to Department of Transport infrastructure

In 2010 the United States enacted an omnibus spending bill. One part of the bill, the "Jobs for Main Street Act of 2010," more commonly referred to as the "Jobs Bill", provided additional infrastructure spending. The act used the same Buy America provisions as the ARRA act of 2009.

The largest areas of spending were highway infrastructure (USD 27 500 million), public transport (USD 8 400 million), school renovation (USD 4 100 million), and the Innovative Technology Loan Guarantee Programme (USD 2 000m). These specific projects represent USD 42 000 million in GP, which could be potentially impacted by the LCR measure.

United States 5 - Defence force purchases of small arms

The National Defence Authorization Act for 2010 requires any procurement of property or services related to small arms to come from 'one of the firms in the small arms production industrial base'.

The documents prepared by the Department of the Army for the 2008/09 budget suggest that the US would procure USD 340 million in small arms and USD 1 010 million in small arms ammunition in that fiscal year.[24] Together this suggests that the Army would procure USD 1 350 million in small arms and related equipment. The total figure for the United States Government is likely to be higher, as the Marines and United States Navy would be likely to procure small arms as well.

23. Mahadzir, D, *Indonesia's Military Modernization,* Asian Military Review, 1 November, 2012, available at: www.asianmilitaryreview.com/indonesias-military-modernization/ (accessed 28 March 2014).

24. Department of the Army, "Weapons and Tracked Combat Vehicles, Army" in *Committee Staff Procurement Backup Book, Fiscal Year (FY) 2008/2009 Budget Estimates, February*. 2007, Available at: asafm.army.mil/Documents/OfficeDocuments/Budget/BudgetMaterials/fy08-09/pforms//wtcv.pdf (accessed on 28 March 2014); and Department of the Army, "Procurement of Ammunition, Army" in *Committee Staff Procurement Backup Book, Fiscal Year (FY) 2008/2009 Budget Estimates, February*. 2007, Available at: asafm.army.mil/Documents/OfficeDocuments/Budget/BudgetMaterials/fy08-09/pforms//wtcv.pdf (accessed on 28 March 2014).

United States 6 - United States Olympic Committee uniforms

In 2013, in consultation with members of the United States Senate, the United States Olympic Committee (USOC) declared a strict "Buy American" policy with respect to the uniforms worn by athletes during parade ceremonies. The USOC has agreed to not change that policy without further consulting the relevant Committees of Jurisdiction in the United States Senate and House of Representatives.

The uniforms for the United States athletes competing at the 2014 Winter Olympics in Sochi were made by Ralph Lauren. 650 uniforms were required for the United States team.[25] Media reports at the time of the unveiling of the uniforms suggested that the retail cost of the uniforms were approximately USD 1 573 each.[26] This suggests that the (retail) cost of the uniforms were USD 1 million, which was completely sourced in the United States.

United States 7 - Buy America provision in Environmental Protection Agency appropriations

The appropriations bill for the Environmental Protection Agency for the 2014 fiscal year included a 'Buy America' provision related to infrastructure related to two specific funds. The two funds are the Clean Water State Revolving Fund (CWSRF) and the Drinking Water State Revolving Fund (DWSRF).

The text of the appropriations bill provides for USD 1 449 million in funding for the CWSRF, and USD 907 million in funding for the DWSRF.[27] This USD 2 356 million in appropriations could potentially be affected by the Buy America provision.

25. Ralph Lauren, *TeamUSA.RalphLauren*, 2014 Ralph Lauren, available at: teamusa.ralphlauren.com/ (accessed 28 March 2014).

26. Today, *Patriotic style: Team USA reveals Olympic Opening Ceremony uniforms*, 2014, Today, 23 January 2014, available at: www.today.com/sochi/patriotic-style-team-usa-reveals-olympic-opening-ceremony-uniforms-2D11970728 (accessed 28 March 2014).

27. H.R. 3547--113th Congress: Consolidated Appropriations Act, 2014. (2013). Available at: www.gpo.gov/fdsys/pkg/BILLS-113hr3547enr/pdf/BILLS-113hr3547enr.pdf (accessed 2 April 2014).