

# *Public policy instruments for procurement: an empirical analysis*

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## Public Policy Instruments for Procurement: An Empirical Analysis

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### ABSTRACT

Policy instruments in procurement are widely used. While the efficiency of the local content policy requirements (LCRs) as one of such instruments has been questioned, it remains a powerful mechanism for the national governments of resource-rich countries. The aim of such LCRs is to extract additional benefits for citizens of these countries, beyond fiscal revenues and enhancing innovation. We analyse the relationship between the LCRs and local procurement using data from 1,326 contracts on extraction and exploration of subsoil in Kazakhstan over the period 2013-2016. We provide empirical evidence that LCRs in this case were not an effective tool in supporting procurement from local suppliers. We argue that firms would prefer to pay fines for non-compliance with LCRs on procurement of goods, works and services rather than use local suppliers. Our findings demonstrate that LCRs are an inefficient policy instrument and require further improvement in Kazakhstan. We offer policy implications for efficient LCRs and highlight the importance of choosing the optimal LCRs to enhance local procurement.

### 1. Introduction

Government policies often aim to promote innovation nationally and regionally (Fernández-Sastre and Reyes-Vintimilla, 2020; Georghiou et al. 2014; Ghisetti, 2017). However, innovation comes at a cost. For example, innovation policy may increase environmental tensions, with technology policies aiming to prevent the problem of environmental degradation, while addressing the issues of sustainable growth (Sinha et al. 2020). Innovation policy may increase competition for resources in local and international markets in a race for new technologies. Nemet (2009:700) argues that “the rising expectations about future demand for new technologies increase the incentives for investments in innovation by enlarging payoffs to successful innovations”.

To improve innovation activity, both developed and developing countries have embarked on procurement policies as an instrument to stimulate innovations and, indirectly, to contribute to decoupling economic growth (Ghisetti, 2017; Fernández-Sastre and Montalvo-Quizhpi, 2019). The crucial role of demand as a key driver of innovation was recognised by Edler and Georghiou (2007) and further advanced by Fernández-Sastre and Montalvo-Quizhpi (2019), who considered public procurement as a demand-side driven innovation policy. Uyarra and

Flanagan (2010) also demonstrated that procurement is an important tool for facilitating innovation.

Technology and social change literature gives significant attention to the role of public procurement as a facilitator of the national industry (Fernández-Sastre and Reyes-Vintimilla, 2020) through raising demand for local output and by promoting the activities of innovative companies (Ferraz et al., 2015; Moñux and Ospina, 2017). However, little is still known about how procurement influences innovation and competitiveness of local suppliers, through the creation of demand for their products. Tammi, et.al., (2020), in their empirical study of SME participation in public procurement, see the relationship between competition and innovation in public procurement as an inverted-U.

Whether or not procurement is a valuable policy instrument to stimulate innovations and facilitate the competitiveness of local suppliers, is yet to be researched (Aschhoff and Sofka, 2009; Belitski et al., 2017; Edler and Georghiou, 2007; Guerzoni and Raiteri, 2015; Shelton and Minniti, 2018). In order to sustain public procurement, a mechanism of institutional intermediation is required. Landoni (2017) described this mechanism as a public agency that manages funds, coordinates companies' technological capabilities, and stimulates a sense of cooperation to achieve innovation.

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In this study we introduce local content requirements (LCRs) in procurements as governmental policy intended to stimulate local growth and innovation, targeted to achieve a certain percentage of intermediate goods, services and works sourced from local suppliers through an increased demand for local suppliers' outputs. There is a strict hierarchy in resource-rich countries depending on whether the governments urge local procurement entities to include LCRs in tenders and/or contracts when these entities procure work, goods and services from local suppliers. We understand local procurement as the process of purchasing of goods, works and services from the local suppliers. Local Content Requirements (LCRs) are widely used by governments as a policy instrument to support local production and employment, in particular in resource-rich countries. The main objective of LCRs is to support local manufacturing and services by setting a minimum share of local goods, works and services in total (annual) procurement of companies. LCR could be included, for example, in contracts on extraction and exploration of subsoil. In this respect, LCRs are used as a policy tool, despite international pressure to eliminate them (Ezell et al., 2013). We understand the effectiveness of LCRs is in achieving competitiveness, by enabling local suppliers to make use of innovations in order to improve their outcomes (Senoo and Armah, 2015; Ovadia, 2014; Kalyuzhnova 2015; 2016).

Some authors suggest that other policy instruments should be used to promote technological innovations (David et al., 2000; Hussinger, 2008). "In energy especially, the requirement for innovation is sufficiently urgent that large-scale domestic and collaborative international research should take place even at the cost of possible competitive disadvantage..." (Weiss and Bonvillian, 2013:1189). Another study by Pinkse et al. (2014) investigates how and to what extent private and public protection levers affect firm-level strategies increasing the attractiveness of disruptive and systemic innovations.

We addressed the recent call in innovation and social change literature (Ghisetti, 2017; Fernández-Sastre and Montalvo-Quizhpi 2019; Obwegeser and Müller 2018; Woldesenbet and Worthington, 2019; Tammi et al., 2020; Sinha et al., 2020) to better understand the nature and mechanisms of procurement in developing and emerging economies.

Using data from 1,326 procurement contracts on extraction and exploration of subsoil in Kazakhstan over the period 2013-2016, we demonstrated that LCRs were ineffective in their intended aim of supporting procurements in goods, services or works by local suppliers. We then discussed various channels that could achieve efficient LCRs (Adedeji et al., 2016; Grossman, 1981; Issabayev and Rizvanoghlu, 2019; Kalyuzhnova et al., 2016, Marcel et al., 2016, Ovadia, 2014; Tammi et al., 2020).

This paper focuses on policy impacts of LCRs and its implementation. It aims to make a contribution to innovation and social change literature by analysing the effectiveness of LCRs as a quantitative measure of local goods, services and works support. In this regard, an understanding of the need for LCRs to be paired with demand-side innovation policy in creating innovative capabilities (Georghiou et al., 2014; Guerzoni and Raiteri, 2015; Warner, 2011; 2017) and managerial capabilities (Walsh and Linton 2001) can contribute to the implementation of policy which allows support of local suppliers. Using the case of emerging economy, we discuss various channels how LCRs could facilitate the development of local suppliers (Bell and Pavitt, 1995; Almus and Czarnitzki, 2003; Cirera and Maloney, 2017; Kalyuzhnova et al., 2016).

The paper is structured as follows. In the next section (Section 2), we review a literature discussing LCRs and procurement as well as its specifics. Section 3 provides government regulation of procurement in Kazakhstan. Section 4 sets up the methodology used and describes the dataset. Section 5 reports and discusses our main results. Section 6 concludes.

## 2. Literature Review

### 2.1. Local content requirements and procurement

Stimulating innovations in the private sector is one the important roles of governments. It is of paramount importance for the development of their societies (Geroski 1990, Mazzucato 2011). Procurement has been a key mean of fostering innovation over the last decade (Li et al., 2020; Intarakumnerd and Gerdtsri, 2014; Kaggwa et al., 2012; Lee et al., 2018; Aschhoff and Sofka, 2009). Uyarra et al. (2020) conceptualized the multiple roles of public procurement in innovation policy and highlighted the complexities and institutional work associated with its implementation. They highlighted the role of government in fostering diversification and transformation through public procurement and explored the implementation challenges of institutionalising public procurement as a part of innovation policy. Edler and Georghiou (2007) also flagged up the importance of public procurement for innovation policy strategies.

Taking into account the impact made by the governments on private sector innovation, as well as the need for demand-side innovation policies, the literature is increasingly interested in these issues (Edler and Georghiou, 2007; Fernández-Sastre and Reyes-Vintimilla, 2020; Fernández-Sastre and Reyes-Vintimilla, 2020; Guerzoni and Raiteri, 2015; Lember, Kalvet and Kattel, 2011, etc). At the present time, the use of public procurement and LCRs is a core of innovation policies in many countries (Li, 2013; Kalyuzhnova et al., 2016; Myoken, 2010; Ribeiro and Furtado, 2015; Vonortas, 2015). The goals of LCRs typically include the promotion of local production, the stimulation of demand-side innovation policies and/or the application of particular technologies. In addition, by using the LCRs, governments wish to channel state funds (contracts and subsidies) primarily to local companies (Ovadia, 2014). However, it is important to recognise the complications of inter-organisational relations and the contracting difficulties of such projects (Genus, 1997).

As mentioned above, the instrument of public procurement to stimulate innovation has been widely discussed and different approaches have been described in the literature (Lember, Kattel and Kalvet, 2014; Rolfstam, 2012, 2013, Yeow and Edler, 2012).

In this paper we concentrate on the two approaches which are commonly referred to Public Procurement (PP) and Public Procurement for Innovation (PPI). PP occurs when the procurement of goods, works or services is acquired by the governments (Uyarra and Dlanagan 2010). The rationale for using regular (conventional) procurement (which involves innovation-friendly procurement practices and favours innovative solutions) includes increasing the value-for-money of works, goods and services as well as increasing the competitiveness of the local suppliers (Edler et al., 2005; Edquist and Zabala-Iturriagoitia, 2012). In such cases the governments act as early adopters of innovative solutions from local business, as described by Fernández-Sastre and Reyes-Vintimilla (2020).

PPI could be defined as the procurement of things which are new and perhaps do not yet even exist, to address a specific need (Lember, Kattel and Kalvet, 2014; Edquist et al., 2016). PPI occurs when, in order to fulfil specific functions within a reasonable time frame, a public organisation places orders of new products and services (Esquist and Zabala-Iturriagoitia, 2012). The rationale behind the PPI approach is to solve the societal problems or support needs of the country. This approach was adopted by many governments, particularly in resource-rich countries. In such countries, governments are using LCRs in order to extract additional benefits for their populations beyond fiscal revenues from business (Ghisetti, 2017). These governments may directly influence private firms' innovation activities by establishing the LCRs in order to demand goods and services that are not yet available in the market (Georghiou et al., 2014). This policy targets the qualitative perspective of procurement. Therefore, LCRs have become commonplace in extractive industries (Kalyuzhnova, 2008; Macatangay, 2016).

Typically, the local content component in extractive industries is low, “although much higher for services than for goods” (Addison and Roe, 2018:509). This may be explained by the fact that the capacities of local supply chains of extractive industries could present an obstacle for the implementation of LCRs, due to insufficient capabilities for R&D activities as well as lack of competitiveness of goods and services (Kalyuzhnova, 2008). The PPI approach can facilitate the development of local business and national economy by increasing demand for local output and by improving the performance of local firms making them more innovative (Moñux and Ospina, 2017; Fernández-Sastre and Reyes-Vintimilla, 2020). Overall, the PPI approach in introducing LCRs includes the following steps: firstly, the governments of resource-rich countries define a need of the agency; secondly, they translate this need into optimal LCRs; thirdly, the tender is announced; fourthly, tender offers are assessed, taking into account a presence of LCRs elements, and the contracts are awarded; finally, the delivery of the goods, works and services is managed and compliance with LCRs is checked. In addition, policy is adopted to promote the innovative capability of local firms (Georghiou et al., 2014; Nicholas and Fruhmman, 2014).

At the present time, the popularity of LCRs as a tool to support regular (conventional innovation-friendly) procurement is increasing (Adedeji et al., 2016), yet the literature has not provided evidence as to the effectiveness for procurement of this tool (Ramdoe, 2015; Georghiou et al., 2014; Veloso, 2006).

There are the following challenges related to implementation of LCRs. First, local suppliers may have difficulty meeting the high standards or quality requirements of the operators if such standards are not strictly defined. Levett et al. (2012), Veloso (2006) and Macatangay (2016) investigate the interactions between externalities, local supplier capabilities and their implications for LCRs. One of the findings relates to the investors’ profit-maximising behaviour, which stimulates local suppliers to become more competitive, and is the market signal for LCRs. Ultimately this provides the local economies with additional economic benefits, as the quantity localised as a result of the LCRs provides more value than the additional procurement cost (Veloso, 2006). Second, governance of the extractive industries may lead to the exclusion of local suppliers, despite the claims of presence of local content (Kragelund, 2017). Third, careless implementation of LCRs could lead to corrupt practices and threaten firm performance (Kalyuzhnova and Belitski, 2019). Fourth, mitigating resource constraints may be problematic (Schuster and Holtbrugge, 2014). Companies seek co-created solutions by incorporating locals and cooperating with non-traditional partners to reduce resource dependency. “Local capacity building (improving the local environment), which is also commonly mentioned in previous studies, is only applied by companies when strong partnerships with local authorities ... are established” (Schuster and Holtbrugge, 2014:56). Finally, in resource-rich countries, procurement decisions can be made centrally (by headquarters of the companies) as well as locally, by the domestic affiliates. This constitutes additional difficulties in creating and implementing the LCP and monitoring the compliance with LCRs (Kalyuzhnova et al., 2016).

When assessing the suitability of different approaches of implementation of LCRs for different countries, it is important to bear in mind that the evaluation of demand-side innovation policies is still rudimentary (Edler et al., 2005). In order to solve this problem, it is essential to understand how to evaluate the effectiveness of LCRs in the PPI framework. This study is the first attempt to narrow this gap in the literature.

## 2.2. Hypotheses formulation

The role of public tools in shaping technological change, direction and intensity has been recognized as crucial in the economics of innovation literature (Edquist and Zabala-Iturriagoitia, 2014; Landoni, 2017; Saastamoinen et al., 2018).

The companies working in resource-rich countries have to adapt their procurement policies to the host government’s requirements for

the quality, origins, use and suppliers of local inputs. Therefore, these requirements are often included by the governments in tendering processes, dividing large contracts into smaller ones (Uyarra et al., 2014; Ghisetti, 2017). However, it can be very challenging to evaluate the quality of innovation which does not yet exist (Fernández-Sastre and Reyes-Vintimilla, 2020). LCRs aim to create a favorable environment for local suppliers by guiding the preparation of the tendering process: “well-crafted corporate local content standards and country-level local content strategies and plans also play their part, and often foresee a role for procurement practices alongside innovative engineering and design, a focus on staff recruitment and training, and targeted social investment and community-based supplier development programmes” (Warner, 2017:6). The general supplier selection problem has been modelled by several authors: Turner (1988), Pan (1989), Chaudhry et al. (1993), and Weber and Current (1993). Weber et al. (1991) summarize other approaches to the supplier selection problem. When a firm is exposed to host government policies, LCRs directly affect its operations, as they require the firm to procure a certain proportion of components from suppliers in the host country.

A public organization purchases goods or services that it needs to perform its function. Such purchases occur in a wide range of sectors; however there is still a lack of knowledge on the mechanisms that could enable government to stimulate innovation in local suppliers via LCRs.

Munson and Rosenblatt (1997) have explained how companies subject to local content rules can determine the country of origin for each of their components in a cost-effective manner. They have presented an efficient solution procedure for the single plant purchasing problem, with no side constraints. According to their conclusion, firms will seek out local suppliers for components where the relative cost penalty is low. Within the physical content protection scheme, firms should try to seek out local suppliers for components where the absolute cost penalty is low. These rules are applicable irrespective of the local content share, the price of the component compared to other components used in production, and the number of components needed per product.

A common obstacle to the implementation of LCRs is a lack of awareness among local businesses (due to the absence of an effective local network) regarding existing opportunities, as well as their inability to comply with the requirements of the tenders.

Based on evaluation of LCRs, many countries have engaged in revising and refining their strategies for promoting local manufacturing. If LCRs neither result in an increase of local job opportunities nor improve competitiveness - the two major goals of LCRs - then a change of the actions is required. Understanding why LCRs fail is crucial in order to adopt more effective LCRs in procurement.

Johnson (2013) identifies several explanatory variables impacting the effectiveness of LCRs, namely: market size and stability, policy design, innovation potential, cooperation and financial incentives. These factors are particularly relevant in procurement. Robustness of innovation determinants is an important component for a company’s capacity to innovate and is crucial to an understanding of national innovation capacity (Santa et al., 2019).

Market size and stability are related to the opportunities/demand for local procurement and competition. If this element is high, it enables economies of scale and leads to local manufacturers building greater capabilities.

At the same time, “appropriate” policy design is crucial. If the governments establish unrealistic and unachievable LCRs, then it could harm local procurement and undermine overall economic development. As Kalyuzhnova (2008) pointed out, the LCRs should be a part of the overall long-term state economic policy to build up the ecosystem required to support local manufacturing.

LCRs are more likely to be successful in ensuring the engagement of local suppliers if two conditions are satisfied: first, that the quality of domestic goods and services is comparable with the quality of foreign products, and secondly, that the costs of non-compliance with LCRs are



greater than the cost of compliance (Macatangay, 2016). In such situations, governments decide how to adjust LCRs when businesses choose to pay fines for non-compliance to it. The aim is to analyze the effect of LCRs on procurement, in order to optimize the LCRs. More precisely, by increasing fines for non-compliance, companies are more likely to proceed with local procurement, to the point where the marginal benefits of compliance are equal to marginal costs (effective LCRs), formally established by the first-order necessary condition for an optimum in the function of the value added of procured goods, services and works:

$$(\partial\pi(\cdot))/\partial c = 0, \quad (1)$$

where  $\pi$  is the value added of procured goods, services and works; as a function of  $c$ , the costs of procurement, fines and prices.

Further increase in LCRs will result in an increase of the procurement costs, leading to decline in procurement (ineffective LCRs), established by a second-order sufficient condition verifying that the optimum is a maximum:

$$(\partial^2\pi(\cdot))/(\partial c^2) < 0 \quad (2)$$

Therefore, we hypothesize:

*H1: Effective LCRs is positively associated with procurements in goods, works and services from local suppliers.*

It is important to distinguish between two procurement effects, namely, between those arising from the natural level of local content and those from the policy-induced level of local content. These effects may be determined by the following instruments which facilitate effective procurements in local goods, works and services. First of all, innovation: if the industry is lacking innovation, or its innovation is jeopardized in some way, then the natural level of local procurement is likely to be low. If the government decides to induce the LCRs in such industries simply by protecting an inefficient industry, the effectiveness of LCRs will be reduced. Secondly, the creation of an environment (in the form of induced LCRs) to enable the local procurement companies to compete with their foreign counterparts (Kalyuzhnova et al., 2016) will increase the policy-induced level of local content.

Policy-induced LCRs do not necessarily lead to an increase in the level of local content. A firm has the choice whether to comply with the LCRs. In some cases, a firm meets the LCRs, so does not pay any fine, which could lead to an increase in LC. However, the share of LC in procurement could decrease, even after the implementation of the LCRs, for two reasons. Firstly, the firm might not meet the LCRs, because even if the firm has to pay a fine for not meeting the requirements, its profit is higher than it would be if the firm had met the LCRs (Grossman, 1981); the firm therefore decides not to engage with meeting LCRs. Secondly, the firm chooses not to invest in local procurement, because the LCRs reduce its profits: thus, the LC decreases (Kolstad and Kinyondo, 2016).

Firms know the procurement cost incurred under LCRs, so strategically decide/adjust their options with regards to LCRs engagement accordingly. If a firm, relying on its knowledge and expertise, finds suitable local suppliers both willing and able to deliver at a suitable cost, the firm might even reduce its actual extra procurement cost and pocket the difference. However, we argue that the opportunity to secure cost savings while the LCRs are adjusted over the policy cycle, akin to a process under price cap regulation, provides an incentive for firms to search for the best-performing local suppliers. This process, in turn, encourages local suppliers to be as competitive as possible and enhances the prospects for strengthening local linkages and technological advancement (Macatangay, 2016).

### 3. Procurement Regulation in Kazakhstan

From the beginning of independence, the Kazakhstani government has aimed to create jobs and to establish an environment promoting Kazakhstani (local, by origin) businesses in specific sectors. However, in the early 1990s, foreign firms had a significant dominance over the

industrial and service sectors of the hydrocarbon industry of Kazakhstan, where the mode of operation was based on an "expatriate" basis (both in terms of human resources and manufacturing facilities, which were exported from abroad) (Kalyuzhnova, 2008).

This situation continued for most of the decade, leading the Kazakhstani government to find ways of boosting LC through legislation to develop economy's industrial capacities. Although Kazakhstan's LCPs first appeared with the Petroleum Law of 1995, the first step was made in the 2000s: "the Registry of Domestic Producers and Foreign Investors was developed to provide local producers the opportunity to understand the potential demand and to act accordingly in their investment decisions and upgrades" (Kalyuzhnova et al., 2016:108). This policy was based on governmental pressure on international energy companies working in Kazakhstan, in order to build up local capabilities via sub-contracts and services.

The 1996 Law on Subsurface and Subsurface Use required companies to propose, from the initial stage, their own LC commitments, namely quantitative indicators (%) of local workers to be employed, procuring products and services of Kazakhstani origin, and commitment to social projects (e.g. improving infrastructure or contributing to the economic and social development of their region of operation). However, this approach was not successful, as subsoil users subverted or bypassed LCRs.

From 2001, LCRs were promoted by the government through a range of laws, decrees and labour quotas. Besides, the government was compelling companies to invest in regional social projects. On 1 December 2004, the terms "Kazakh manufacturer", "Kazakh origin" (goods, works and services (GWS) of Kazakh origin), "Kazakh content" were introduced into the subsoil legislation, as part of a governmental review of the LCP framework. More specific LCPs were laid out in the 2005 Law Concerning Production Sharing Agreements when Conducting Offshore Petroleum Operations. However, until the end of 2009, the LCP in Kazakhstan was more a statement of intent than robust policy. December 29, 2009, saw the adoption of the Law on Amendments to Some Legislative Acts on Kazakh Content; in 2010, further evolution of LC took place with significant regulatory change represented by the introduction of the new Law on Subsurface and Subsurface Use (2010).

LCPs (although still focusing on local labour and procurement) were thus "shifted toward the overarching objective of economic diversification and the reduction of economic dependency on the oil sector" (Tordo and Anouti, 2013:114). The government introduced clear targets, procurement rules, and strict measurement procedures. These policies were felt by all sectors of the economy. Prequalification of potential suppliers is an independent audit of potential suppliers, allowing to assess the supplier's ability to perform work, provide services and deliver goods, and providing protection from the participation of other firms. "Local content requirements are usually part of the state-managed subsoil use licensing system and, in some cases, determine market access." (OECD 2018: 36)

In Kazakhstan LCPs encompassed all possible areas, including procurement of goods and services, local employment (often involving skills development and training components in addition to the creation of job opportunities), fostering local technological expertise and SME activities. In recent years, the government has attempted to provide a boost to local competitiveness through requirements to contribute to R&D and innovation.

Quantitative requirements are supposed to provide employment, goods and service opportunities for local nationals and domestic firms. For example, the subsoil licence holder has to ensure that at least 50% of the total number of employees consists of Kazakhstani nationals. It is no secret that the mandatory quantitative LCRs introduced by the Kazakhstani government became a subject of constant criticism by the opponents of the LCP as well as by foreign investors, whose main argument is based on Kazakhstan's insufficient source capacity.

In 2015, Kazakhstan joined the World Trade Organisation (WTO). Under WTO regulations, LCRs in the form of mandatory sourcing of

inputs is explicitly prohibited. WTO restricts certain types of LCP and quantitative targets. However, a series of exemptions exist, relating to government procurement, the encouragement of technology transfer and for least developed countries (Ramdoo, 2015). In the context of Kazakhstan's accession to the WTO, it is envisaged that this type of quantitative LCRs would be abolished by 2021, aligning the country's LCP practices with those seen in various OECD jurisdictions.

The WTO agreement, ratified by Kazakhstan, establishes a transition period for full implementation of WTO requirements, until 1 January 2021. After the transition period, all measures of support and LCRs in the subsoil contracts are to be abolished. Subsidies connected with export and import substitution will be prohibited upon the agreement coming into legal force and all LCRs on procurement of goods and services (for commercial use) are to be abolished.

Accession to the WTO potentially signals the beginning of a new approach to industrial policy in Kazakhstan: the effect of this policy on LCRs should change the companies' perceptions of competitiveness (without protectionist measures), as well as testing the effectiveness of the functioning of these enterprises. Since Subsoil Law (1996), LC has been an evolving and increasingly important element of Kazakhstan's approach to natural resource management. All changes in the local content system within the integration processes have been reflected in the subsoil use legislation, in particular in the Code introduced in December 2017. From 2021 such policies are to be abandoned. WTO membership thus redefines the parameters for industrial policy in Kazakhstan.

The Kazakhstani government's rule for subsoil users is to reach 50% share of LC in the total amount of purchased works and services. This does not contradict the WTO rules. For example, by 2021 LCRs in works and services should be reduced to 50% in the contracts concluded between September 2011 and January 1, 2015. Such obligations shall be preserved for the entire duration period of the contracts concluded before September 2011. However, the 20% conditional discount for Kazakhstan's producers of works and services in subsoil users' procurements has been preserved.

The Code of the Republic of Kazakhstan "On Subsoil and Subsoil Use" includes the LCRs in works and services of at least 50% of the total amount of purchased works and services. In addition, it also includes at least 50% for each type from the list of priority works and services, together with requirements for the minimum LC in staff, for compulsory financing of training of Kazakhstani staff and science. The Code of the Ministry of Energy includes the state regulation of the procurement process of subsoil users, which is also a crucial part of the system of support and protection of domestic producers. Therefore, despite Kazakhstan's accession to the WTO, LCP remains for the country and its government an active area of work.

#### 4. Data and Methodology

In this section we provide a rationale for using the quantitative method in order to test our hypothesis. Using econometric analysis of data on procurement contracts in Kazakhstan, we are able to extract useful information about LCP and LCRs efficacy in the way they impact procurement.

##### 4.1. Data

Data used in previous studies, based on survey analysis and covering businesses with one or more employees in the manufacturing, service and industry sectors within the sample, is stratified by size, sector and country. (Ghisetti, 2017) Respondents were general managers, financial directors or owners. It is a valuable source of information, as it is the only available survey that combines, at the firm level, information on public procurement with information on the adoption of environmental innovations (Czarnitzki and Lopes-Bento, 2014).

Procurement decisions are often concentrated on risk mitigation

(Georghiou et al., 2014), to which implementation of LCRs could therefore be perceived as a threat. This perceived threat relates to the quality and price as well as the sustainability of the local goods, services and works. The mechanisms which are associated with value-creating innovations, value appropriation or improved efficiency and responsiveness to changing environments will be vital to ensure the efficiency of procurement decisions. Dahel (2003) developed the model of supplier selection, taking into account different factors such as price, product quality, and supply capacity. His model determines the optimal number of suppliers to employ and the quantity they must supply in order to minimize purchase costs and maximize product quality. Lambropoulos (2007) highlights the importance of choosing an appropriate procurement method related to goods, services and works. This choice depends on various aspects. Lambropoulos (2007) asserts that the "best overall" method does not exist, but that the most appropriate method is determined by the specific conditions, including macro environment, economic development, foreign market risks (exchange rate), availability of skilled and unskilled labor (graduates in a region) and other project specific factors. In this context, the project procurement is vital for delivering project outcomes (Alias et al., 2012).

In order to test our hypothesis, we use the procurement contracts data obtained from JSC National Agency on Development of Local Content (NadLoc). This is a state agency responsible for the execution of the decree of the Government of the Republic of Kazakhstan "On Measures to Strengthen State Support for Domestic Manufacturers" with 100% state participation in the authorized capital.

The dataset consists of 1,326 contracts on extraction and exploration of Kazakhstani subsoil during the period of 2013-2016. Although 2013-2016 saw a period of severe downturn in mineral prices, LCPs was fully fledged in Kazakhstan and monitoring was very strict at the time (the last years before entering WTO). The decline in mineral prices had an effect on all economic activities; therefore, we argue that this was a fixed time effect for all firms. In addition, we use regional annual data across 14 administrative regions, and country-level annual data from Kazakhstan over the period 2013 to 2016 (Table 1).

##### Dependent variables

We used three dependent variables: *GOODS*, *WORKS* and *SERVICES* to measure the local procurement. First, we used the share of local goods in the total value of goods purchased by the firm in procurement contract. Second, we used the share of local services in the total value of services purchased by the firm in procurement contract. Third, we used the share of local works in the total value of works purchased by the firm in procurement contract. (Adedeji et al., 2016; Ihua et al., 2011; Esteves and Barclay, 2011).

##### Explanatory variables

We use three independent variables to measure the extent of LCRs in procurement of goods, services and works. First independent variable is LCRs in procurements of goods, which are set in contracts on extraction and exploration, % of value of procurements of goods. Second variable is LCRs in procurements of works, which are set in contracts on extraction and exploration, % of value of procurements of works. Third variable is LCRs in procurements of services, which are set in contracts on extraction and exploration, % of value of procurements of services. (Kalyuzhnova et al., 2016)

##### Control variables

We introduce regional level variables, the number of graduates, the number of SMEs, gross regional capital formation (GRP), and the population size, in order to control for the characteristics of the region where the contract with a firm is signed (Audretsch et al., 2018).

First, we include the number of graduates (GRADUATES) from regional universities as a proxy for the level of human capital in the region (Gennaioli et al., 2013). Moretti (2004) found that the share of college graduates living in a city impacts associated spillovers and leads

**Table 1**  
Variables

Variable	Description	Mean	St. dev.	Contract-level	Region-level	Period-level
<b>Dependent variables</b>						
GOODS	Actual % of local goods purchased in total value of goods purchased	34.40	31.13			
WORKS	Actual % of local works purchased in total value of works purchased	88.64	20.04			
SERVICES	Actual % of local services purchased in total value of services purchased	93.72	14.08			
<b>Independent variables</b>						
LCRs_goods	LC requirements in procurements of goods, which are set in contracts on extraction and exploration, % of value of procurements of goods	36.43	26.48			
LCRs_works	LC requirements in procurements of works, which are set in contracts on extraction and exploration, % of value of procurements of works	78.86	22.86			
LCRs_services	LC requirements in procurements of services, which are set in contracts on extraction and exploration, % of value of procurements of services	79.58	22.51			
EXTRACTION	Dummy variable, equals 1 if firm got contract only on extraction of subsoils and 0 otherwise	0.62	0.48			
SME	Number of SMEs, thousands	58.13	7.93			
GRP	Real Gross Regional Product per capita, thousand Kazakhstani Tenge (KZT)	1784.15	868.07			
POPULATION	Population size, people	1,217,508	453,901			
GRADUATE	Number of graduates from Kazakhstani universities, who graduated in the current year, in logarithms	9.32	8.54			
GRADUATE 1999	Number of graduates from Kazakhstani universities, who graduated in 1999 by region, in logarithms	9.17	8.10			
EXCHANGE	Average annual domestic currency exchange rate, KZT per USD	244.68	80.87			

Sources: National Agency on Development of Local Content (NADLoC) ([www.nadloc.kz](http://www.nadloc.kz)); Committee of geology and subsoil use (<http://geology.gov.kz>); Committee of Statistics of Kazakhstan exchange rate data ([www.stat.gov.kz](http://www.stat.gov.kz)).

to an increase in regional output. [Iranzo and Peri \(2009\)](#) estimate that one extra year of college per worker increases the regional total factor productivity (TFP). Previous studies found a potentially sizeable effect of graduates on regional output via social interactions and R&D ([Lucas, 1997](#)), a finding also consistent with the literature in urban economics (e.g., [Glaeser and Gottlieb, 2009](#)). While we acknowledge the graduate migration between regions in Kazakhstan, we are interested in regional ability to generate human capital. In addition, we included the number of graduates (GRADUATES 1999) from regional universities in 1999 as a proxy for human capital concentration in regions (in logs). LCRs on local labor force were introduced earlier in Kazakhstan than the LCRs on services and goods; it is therefore important to incorporate in the model the lag effect of human capital on local procurement.

Second, we include the number of small and medium size enterprises (SMEs) in the region as a proxy of business intensity and entrepreneurial activity in the region, consistent with the regional economics literature ([Glaeser and Mare, 2001](#); [Audretsch, et al., 2015](#)).

Third, we introduce real gross regional product per capita (GRP) as a proxy for regional economic development. ([Thurik and Wennekers, 2004](#)).

Fourth, we include regional population size (POPULATION), which is used in urban and regional literature as a proxy for market size ([Reynolds et al., 1994](#)). We used regional fixed effects to control for changes taking place over time within each Kazakhstani region. To capture possible currency fluctuations potentially affecting the implementation of the contract during the examined period, we used national currency exchange rate (EXCHANGE). It is known that exchange rate uncertainty adversely affects the performance of international portfolios and contracts ([Eun and Resnick, 1988](#)), exchange rates, forward contracts, and international portfolio selection. Therefore, it is important to control exchange rate volatility when analyzing the implementation of the contracts. The variables measuring characteristics of firms/contracts are highly limited due to confidentiality of subsoil users' contracts. Three variables were taken from the contracts: LCRs, EXTRACTION and SUBSOIL.

LCRs measures a percentage of minimum required purchase of local goods, works and services in total value of purchased goods, works and services respectively.

EXTRACTION is a dummy variable, equals 1 if the firm got a contract only on extraction of subsoils and 0 otherwise. Exploration contracts is a

reference category. Subsoil contracts can be contracts on extraction, exploration or both.

SUBSOIL is a categorical variable which is used to derive seven binary variables indicating the type of subsoil contract, i.e., coal, copper, iron, manganese, poly-metals, precious metals, uranium and other. All binary variables are included in the equation with coal as a reference category.

Regional level variables, the number of graduates from Kazakhstani universities in the current year (GRADUATES) and in 1999 (GRADUATE 1999), the number of SMEs (SME), the size of population (POPULATION), and the real GRP per capita (GRP), measure characteristics of 14 administrative regions where subsoil users are located. Region-level data are obtained from Kazakhstan's Statistics Committee ([Azhgaliyeva et al., 2017](#)).

Exchange rate (EXCHANGE) is not available across administrative regions, which is why country-level exchange rate of the National Bank (the central bank) of Kazakhstan is used. Exchange rate is measured as country's average annual domestic currency exchange rate, domestic currency per US dollar.

Table 1 provides descriptive statistics for the contract and regional variables. Average local content in procurements is lower for goods (34.4%) than for works (88.64%) and services (93.72%). Interestingly, the average actual local content in procurements of goods (34.4%) is lower than the average required local content for goods (36.43%). While the average actual local content in procurements of works (88.64%) and services (93.72%) is greater than the average required local content for works (78.86%) and services (79.58%).

Compliance with LCRs was mandatory and set in contract on extraction and exploration of subsoil, with fines imposed for disobedience of the rules (Table 2). Fines are set along with LCRs in contracts on extraction and exploration of subsoil. For contracts signed over the period 2010-2014, fines were set at 30% of value of not-fulfilled LCRs. Starting from 2015, the fines were significantly reduced for works and services to 1% of value of not fulfilled LCRs and were waived for goods. Over the period 2013-2016 both LCRs and fines had a tendency to decline (Figure 1 and Table 2).

#### 4.2. Model

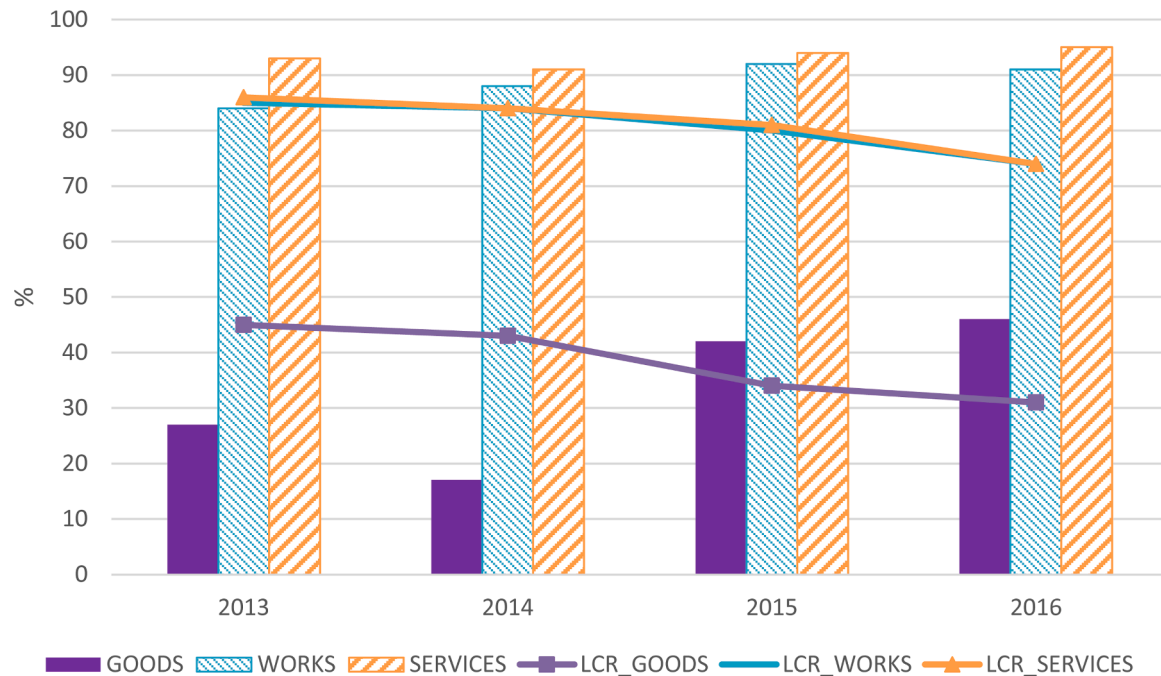
Given the panel structure of the data, each equation was estimated



**Table 2**  
Average LCRs and fines

Variable	Observations	Average LC, %				Average LCR, %				Fines, %			
		2013	2014	2015	2016	2013	2014	2015	2016	From 2011	From 2015	From 2018	From 2020
GOODS	1211	27	17	42	46	45	43	34	31	30	0	0	0
WORKS	1209	84	88	92	91	85	84	80	74	30	1	10	30
SERVICES	1210	93	91	94	95	86	84	81	74	30	1	10	30

Sources: NADLoc; Government of the Republic of Kazakhstan (2010), Minister for Investment and Development of the Republic of Kazakhstan (2015), Minister of Energy of the Republic of Kazakhstan (2018) and Minister of Industry and Infrastructure Development of the Republic of Kazakhstan (2020).



**Figure 1.** Sample average actual local content and local content requirements on goods, works and services in procurements  
Sources: NADLoc.

using two different panel estimation techniques: Fixed Effects (FE) and Random Effects (RE) which were used in previous studies on the instruments of procurement (Ghisetti, 2017). The FE estimator concentrates on differences that, over time, characterise a single contract. This is why the FE estimator is also referred to as the 'within' estimator. That is, it explains to what extent a given LCRs's change in a variable of interest affects its procurement. Thus, the FE estimator does not account for possible differences that exist across contracts at a given point in time and therefore does not identify the factors capturing why, for instance, the extent of procurement of goods (services, works) in contract *i* is different from that of contract *j*. This is not the case of the RE estimator, obtained by weighing the 'within' effect with the 'between' effect. This allows us to identify the factors, including LCRs and other contract characteristics, which explain the differences between the contracts in the panel. Thus, the RE estimates should provide a more exhaustive scenario of the drivers of local procurement by each contract in our sample. However, the possibility of a simultaneity bias induced by unobservable factors often suggests that the FE estimates may be preferable. We performed the Hausman test (Hausman, 1978) to find the statistical evidence of the chosen estimator. In addition, we also performed Breusch–Pagan Lagrange multiplier test (Breusch and Pagan, 1979) (Table 3). The Breusch and Pagan Lagrange-multiplier test for random effects, a test that  $Var(v_i)=0$ . We argue that if the test is significant, the model is better estimated through OLS.

Hausman test demonstrated that the fixed effects are preferred to random effects given the values of chi-square statistics. However, given the unbalanced panel data due to the short lag (maximum three years)

**Table 3**  
Tests results

Dependent variable	Hausman test $\chi^2$ H0: RE vs. H1: FE	Breusch–Pagan Lagrange multiplier test $\chi^2$ H0: RE vs. H1: FE	Breusch–Pagan/ Cook–Weisberg heteroscedasticity testH0: homoscedasticityvs.H1: heteroscedasticity
Goods	15.83 (p=0.01)	–	–
Works	16.72 (p=0.01)	0.48	129.99
Services	39.92 (p=0.01)	–	–

for the contracts, as some contracts may only be observed for one or two years, the mixed effect model using both random and fixed effects is preferred. This means that random effect estimation will include a fixed effect component - subsoil industry and region fixed effects.

The Breusch and Pagan Lagrange-multiplier test for random effects is not supported for works equation, which means OLS estimation is efficient. However, it is possible to obtain the test result for goods and services equations. Finally, we performed Breusch–Pagan/ Cook–Weisberg heteroscedasticity test and identified that heterogeneity needs to be corrected in standard errors, with the result being available for works equation only. The results of tests indicated that standard errors robust for heteroskedasticity should be used, and that both fixed

and random effects in the estimation for all three models should be included.

Contractual (agency) theory applies broadly to circumstances in which one actor (government) delegates responsibility for the implementation of LCRs to another actor (company). The government needs to ensure that the delegated activities regarding LCRs are undertaken in a way that serves government interest rather than the interest of the company (Jensen and Meckling, 1976). Therefore, procurement contracts in local goods, services and works are strongly associated with the government's LCRs.

Our methodological strategy was to analyse the link between LCR and compliance with the regulation on procurement. Given the availability of LCR and percentage of compliance data by year, we can identify causal relationships from the contract data. Our data includes all contracts on extraction and exploration of metal in Kazakhstan from 2013-2016. There are therefore no selection problems or confounders which could make the outcomes biased, because all contracts were included. Private firms that did not have contracts of extraction and exploration in Kazakhstan were not subject to LCR nor they could implement the contract. LCR was compulsory in all contracts over the studied period and firms could not choose whether or not to include LCR in contracts.

Overall, the procurement process is a complex and structured process with particular considerations relative to quality, price, delivery schedule and the right location for sourcing. LCRs are the key point in the invitation to tender formulation. "When the targets are adapted to the local context and are attainable for domestic suppliers, tender requirements can lead to a substantial growth of the local supplier industries..." (Extractives Hub, 2020: Chapter 6). Localization of goods, works and services became a focal point in the procurement processes of resource-rich economies (Kalyuzhnova, 2008). Therefore, our econometric model includes three separate equations, which relate to localization factors for procurement process:

$$GOODS_{ijt} = \alpha + \sum \beta_k C_{ijt} + \sum \gamma_l R_{jt} + \sum \delta_m M_t + \sum \vartheta_n L_t + \varepsilon_{1ijt} \quad (3)$$

$$WORKS_{ijt} = \alpha + \sum \beta_k C_{ijt} + \sum \gamma_l R_{jt} + \sum \delta_m M_t + \sum \vartheta_n L_t + \varepsilon_{2ijt} \quad (4)$$

$$SERVICES_{ijt} = \alpha + \sum \beta_k C_{ijt} + \sum \gamma_l R_{jt} + \sum \delta_m M_t + \sum \vartheta_n L_t + \varepsilon_{3ijt} \quad (5)$$

where  $GOODS_{ijt}$ ,  $WORKS_{ijt}$  and  $SERVICES_{ijt}$  in contract  $i$ , region  $j$  and period  $t$ ;  $C_{ijt}$  includes contract characteristics of region  $j$  and period  $t$ ;  $R_{jt}$  include characteristics of region  $j$  and period  $t$  (GRP per capita, number of SMEs, population, number of graduates from Kazakhstani universities);  $M_t$  is exchange rate at period  $t$ ;  $L_t$  - number of graduates from Kazakhstani universities in 1999;  $\varepsilon_{1ijt}$ ,  $\varepsilon_{2ijt}$  and  $\varepsilon_{3ijt}$  are error terms;  $\alpha_1$ ,  $\alpha_2$  and  $\alpha_3$  are constants.  $\beta_1, \beta_2, \beta_3$  are vectors of regression coefficients of the contract variables.  $\gamma_1, \gamma_2, \gamma_3$  are vectors of regression coefficients of the regional variables;  $\delta_1, \delta_2, \delta_3$  vectors of regression coefficients of the exchange rate;  $\vartheta_1, \vartheta_2, \vartheta_3$  vectors of regression coefficient of the number of graduates from Kazakhstani universities in 1999.

The estimation of Eq.(1)-(3) allows us to postulate causality between LCR and level of compliance. This is feasible because the LCR and contract data are annual, meaning we can observe whether LCRs were compliant.

It may be the case that, as a result of government and industry consultation after the level of local procurement has been observed, the LCRs are revised. For example, if a company has not employed a sufficient proportion (from the government's point of view) of local labour, then the LCRs in procurement in works can be increased. Although we cannot exclude the reverse causality in certain cases, we argue that both LCRs and procurement contracts are interdependent. Our hypothesis explicitly integrates this assumption into the theoretical framework.

## 5. Results and Discussion

Empirical results are presented in Table 4. We reject our hypothesis that effective LCRs are positively associated with procurements in goods, works and services from local suppliers. While procurements are increasingly seen as an important potential instrument of innovation policy (Georghiou et al., 2014; Uyarra et al., 2014; Ladoni, 2016), we did not find that LCRs in Kazakhstan were efficient. One per cent increase in LCRs in procurement of goods decreases actual percentage of local goods purchased by 0.15 ( $\beta = -0.15, p < 0.05$ ). The imposed LCRs not only do not facilitate or increase procurement of local goods, they have the reverse effect. The increase in LCRs in works and services is not associated with changes in LCRs compliance.

As noted in our finding, LCRs as a policy instrument appear to be targeted towards the main deficiencies experienced by private firms in their search of innovation (Georghiou et al., 2014). Our results do not support Kazzazi and Nouri (2012), who found that there was a significant direct relationship between LCP and LC development, but support Georghiou et al. (2014) for the results in the mechanisms of public procurement. By contrast, Kazzazi and Nouri (2012), found that an effective LCP would increase participation of local firms and boost procurement (Ihua et al., 2011; Esteves and Barclay, 2011). Our results partly support Adedeji et al. (2016) regarding increased participation of local firms, as their findings demonstrated that local value created as a result of LCRs implementation was lower than the expected target.

The distinct difference of our results with the prior research (Georghiou et al., 2014; Uyarra et al., 2014) is that the fundamental innovation-related activity of local firms may come from both public and private purchasers, and that our contract data enables us to directly control whether LCP is an efficient instrument for procurement from local suppliers.

The implementation of LCRs in Kazakhstan has passed its optimal maximum. Macatangay (2016) presented a theoretical model of the optimal LCP for extractive industries. The negative effect of LCRs on local procurement could be explained by the low quality of the local inputs.

At the same time, we do not find such a relationship between local inputs and procurement of works and services. We relate this finding to natural level of local content (Macatangay, 2016), which can exist without specific LCRs. To underpin the connection on the implementation of LCRs and local value creation, Issabayev and Rizvanoghlu (2019) calculated the optimal LCRs through a Nash-bargaining between host government and foreign firm. Following their logic, our results demonstrate that the Kazakhstani government has not implemented LCRs for procurement at the optimum level. Therefore, the implementation of the LCRs by procurement entities needs to be closely observed to ensure its efficacy in increasing local procurement. Similarly, Esteves and Barclay (2011) found that the lack of infrastructure can be an additional cost for locally produced input materials and can reduce procurement.

We argue that as a result of LCRs implementation, products cannot be easily substituted by local components. This is because the cost of substituting foreign goods for local equivalents is higher than the fines of non-compliance with LCRs. Interestingly, starting from 2015, the fines were significantly reduced for works and services and were waived for goods. Such a change was an indirect indicator of inefficiency of LCRs. Adedeji et al. (2016) and the prior study by Grossman (1981) have demonstrated that LCRs can have a negative effect on local goods by discouraging the substitution of existing foreign components of goods by locally produced components.

Our empirical model also allowed us to estimate the impact of other factors on local procurement. First, the extraction firms had a lower share of local goods by 16.17 percentage points (-16.17,  $p < 0.01$ ) than exploration firms (due to the nature of the extraction process). However, there is no difference in procurements of local works and services between extraction firms and exploration firms. That could be explained

**Table 4**  
Empirical results of random effect GLS regression

VARIABLES	GOODS		WORKS		SERVICES	
	Coef.	Robust std.err.	Coef.	Robust std.err.	Coef.	Robust std.err.
<b>Contract-level</b>						
LCRs	-0.15**	(0.07)	0.04	(0.05)	0.04	(0.04)
EXTRACTION	-16.17***	(5.77)	-1.59	(1.93)	-1.74	(1.32)
<b>Region-level</b>						
GRADUATES	0.01	(0.00)	0.01	(0.00)	0.01	(0.00)
GRADUATES 1999	0.04	(0.03)	0.03***	(0.00)	0.01*	(0.00)
SME	1.46***	(0.43)	0.38	(0.43)	-0.01	(0.19)
POPULATION	-0.01	(0.00)	-0.01	(0.00)	-0.01	(0.00)
GRP	0.01	(0.02)	0.01	(0.01)	-0.01	(0.01)
<b>Country-level</b>						
EXCHANGE RATE	-0.04	(0.10)	-0.00	(0.11)	0.03	(0.05)
<b>SUBSOIL (subsoil control binary variables)</b>						
Copper	-4.71	(6.29)	15.47**	(7.18)	-2.18	(3.19)
Iron	-6.03	(6.63)	17.46**	(7.77)	-1.98	(3.72)
Manganese	6.93	(8.35)	15.22**	(7.33)	-0.79	(3.71)
Polymetals (excluding copper)	-5.91	(6.54)	15.15*	(7.72)	2.35	(3.00)
Precious metals	-3.15	(5.58)	14.98**	(7.23)	-2.84	(3.03)
Uranium	33.43**	(14.74)	16.43	(11.00)	-8.80	(6.97)
Other	0.32	(6.00)	10.01	(7.72)	-2.92	(3.27)
<b>REGION (region control binary variables)</b>						
Aktubinskaya	-8.12	(18.17)	4.61	(12.86)	7.74	(8.52)
Almatinskaya	30.11	(178.44)	84.37	(140.00)	93.72	(79.64)
East Kazakhstan	-18.75	(85.87)	29.78	(61.75)	48.20	(40.42)
Zhambylskaya	5.87	(50.45)	36.57	(39.66)	27.11	(23.22)
West Kazakhstan	16.73	(37.25)	-31.41	(38.17)	-1.71	(16.77)
Karagandinskaya	-14.83	(79.63)	22.63	(53.68)	47.97	(39.31)
Kostanayskaya	-12.56	(20.66)	11.14	(14.47)	10.62	(9.18)
Kyzylordinskaya	18.85	(18.67)	-5.46	(13.54)	1.61	(6.41)
Mangistauskaya	-3.60	(17.20)	1.09	(13.00)	-1.40	(9.79)
Pavlodarskaya	-3.59	(-17.20)	1.08	(-12.99)	1.13	(18.61)
North Kazakhstan	15.83	(39.44)	-3.02	(22.59)	-20.18	(14.06)
South Kazakhstan	5.67	(266.80)	84.27	(202.44)	150.03	(126.48)
Constant	-25.44	(87.77)	56.52	(59.40)	144.64***	(44.92)
Wald $\chi^2$	255.73***		44.40**			
$\sigma_u$	14.91		15.09		6.27	
$\sigma_e$	22.86		14.94		11.82	
$\rho$	0.30		0.50		0.22	
R <sup>2</sup> -within	0.13		0.03		0.01	
R <sup>2</sup> -between	0.38		0.16		0.04	
R <sup>2</sup> -overall	0.25		0.11		0.04	
Number of contracts	213		238		337	
Observations	483		443		727	

Note: Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

by the specifics of the extraction activities and the adaptability of the LCRs in this process.

Second, regions with a higher number of SMEs have higher procurement in local goods. If the number of SME in a region increases by 1,000 (that is 17% of a mean number of SMEs (58,130) in a region), then the share of local goods in procurements increases by 1.46 percentage points. This supports [Ascani et al. \(2020\)](#), who found that internal specialisations and the regional external linkages can generate indigenous innovation.

Other regional characteristics such as economic development, exchange rate, human capital and market size did not affect local procurement in works, goods and services. Macroeconomic and regional conditions may have indirect impact on procurement of local suppliers.

Policy implementation often faces challenges, one of the most crucial obstacles being the cost of implementing LCRs. In order to make LCRs more effective in supporting local procurement, tangible incentives should be considered, aiming at the optimisation of the costs of local procurement and a long-lasting impact of LCRs on procurement efficiency. ([Kalyuzhnova, 2008](#)).

## 6. Conclusions

In this paper, using data on subsoil contracts and focusing on policy impacts and casual reasoning, we investigated the extent to which the implementation of LCRs can facilitate local procurement in the extractive industry in Kazakhstan. In so doing, this study extends the literature on local content, innovation and social change.

We examined the role of contract characteristics as a mechanism of LCRs implementation and its impact on procurement. Like [Giorghiou et al. \(2014\)](#), we take as starting point what might be described as the LCRs conditions for procurement, including legislative limits and the broader government control over contract compliance. In addition, we provided a more nuanced analysis of the conditions for effective LCRs as a policy tool, realising that domestic sourcing of goods, works and services in procurement could be challenging and take longer than anticipated. Relevant conditions are the comparability of domestic products to the quality of foreign products as well as the costs of LCRs compliance. Our key findings confirm that existing LCRs have only partially achieved their purposes.

The main challenge for the Kazakhstani procurement system remains the creation and capture of local innovation through procurement. This would allow innovation characteristics of local suppliers, rather than

LCRs, to be a decisive factor in the procurement. As [Borrás and Edquist \(2019\)](#) indicated, innovation policy-making can include education, training and skills development; functional procurement as demand-side; changing institutions and regulations; and the public financing of early stage innovations.

Future research could examine the role that innovation may play to facilitate quality of domestic products. Unlike prior research on the public instruments in procurement, ([Ghisettii, 2017](#); [Tammi et al. 2020](#)), our study suggests that management of the local suppliers chain can emerge as an effective tool of private procurement and innovation policy in a country. In addition, the COVID-19 pandemic has caused global difficulties to all sectors of the economy, and procurement is not an exception. It became clear that supply chain requires stronger and more responsive relationships between suppliers and buyers. Zooming the problem into the local setting, it is evident that the short-term problems relate to challenges balancing demand and supply following this extreme external shock. The ability to introduce a collaborative approach therefore presents a robust solution in such circumstances. To tackle this problem, more research is needed into how to avoid the challenges presented by external shocks and address them with more sustainable supply chains, in particular with local supply chains which are much more complex in respect of sustainability.

The limitations of this study are: firstly, we have only considered procurement for extractive industries, which does not always truly reflect the multifaceted phenomenon of procurement. Secondly, while we use panel data and infer the causality between the LCRs and local procurement, the contract characteristics are limited to contract type, the level of LCRs and the date when the contract was awarded. Overall, causality and causal reasoning in empirical analysis in economics/social science is currently under discussion ([An and Ahn 2016](#); [Zorio-Grima and Merello 2020](#)). Thirdly, we only capture the quantity parameters of local procurement that could evaluate the quality of goods, services and works supplied.

The implications for policy are as follows. To make LCRs an effective tool in assisting local procurement, Kazakhstan needs to look at the pillars that determine the success of the government economic policy, e. g. innovation-enhancing procurement ([OECD 2017](#)). Until 2021 this included both protectionist measures (in the form of LCRs) and competition policy. Would the LCRs, restricted under WTO rules, make a difference to overall Kazakhstani competitiveness? The experience of other resource-rich countries demonstrates that in some cases LCRs can stimulate domestic product development, boosting productivity and exports as well moving to higher stages of value chain, thus improving competitiveness ([Adewuyi and Oyejide, 2012](#); [Ezell et al., 2013](#); [Tordo et al., 2013](#)); other cases have established that the LCRs can become an impediment to competitiveness and cause harm to foreign investment and trade ([Evenett and Fritz, 2016](#); [Yalcin et al., 2017](#)). Experience with LCRs also demonstrates that despite ambitions to terminate LCRs in accordance with timelines embodied in WTO agreements or other international treaties, some resource-rich countries support/promote LCRs beyond the agreed dates. ([Ado, 2013](#); [Cimino et al., 2014](#), [Hestermeier and Nielsen, 2014](#)). In such cases the forms, terms and strategies undergo changes, but the extraction-led domestic value-added production remains essentially the same. Kazakhstan would need a rigorous analysis of the current situation, acknowledging the time constraints and with realistic expectations regarding the LCRs.

Our policy recommendations deriving from this study area are: firstly, that governments and operators should raise awareness among local suppliers about required products and services; secondly, it is necessary to specify the expected quality of local supply. Thirdly, LCRs policy will encourage a greater participation of local suppliers in the bidding processes. Finally, more effective collaboration between major stakeholders such as local subcontractors, operators and host governments needs to be fostered. It is important to create conditions for local suppliers to become more innovative ([Tammi et al. 2020](#)), and to provide targeted supply-side support to local firms ([Lember, Kalvet and Kattel](#)

[2011](#); [Fernández-Sastre and Reyes-Vintimilla, 2020](#)). In addition, off-shelf solutions need to be complemented by innovative products. Eqn. (4),(5)

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## CRedit authorship contribution statement

**Yelena Kalyuzhnova:** Supervision, Conceptualization, Resources, Project administration, Funding acquisition, Writing – original draft, Writing – review & editing. **Dina Azhgaliyeva:** Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Maksim Belitski:** Methodology, Writing – original draft, Writing – review & editing.

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