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The demand for defense spending in Russia: Economic and strategic determinants

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Abstract

The allocation of resources to defense and national security is influenced by several factors, both domestic and external. Findings, reported in the relevant empirical literature, suggest that military spending is determined by a cohort of economic, strategic and political factors. This paper estimates a demand function for Russian military expenditure for the period 1992–2015. The results indicate that Russian defense spending is strongly dependent on income from energy exports as well as on the overall performance of the Russian economy. Strategic factors also emerge as significant determinants of such expenditure.

Keywords: Russian defense spending, military expenditure, GAMMs.
JEL classification: C22, H41, H56.

1. Introduction

Defense spending is the cost for producing military power since it represents expenditure on the inputs used in the production of military capabilities and strength. This type of public expenditure is primarily of strategic nature given that “[t]he first duty of the sovereign, that of protecting the society from the violence and invasion of other independent societies, can be performed only by means of a military force”.[1] The evolution and fluctuation over time of military spending globally, largely reflects the changes in the international system and the global security environment (Sandler and George, 2016). Spending on defense and the production of military capabilities is a pivotal tool of internal balancing for deterrence and/or coercive use. States use their military strength in order to either

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[1] Adam Smith in the *Wealth of Nations*, 1776, Book V.

protect or advance their national interests in the given international environment with the challenges, opportunities and threats it encompasses (Fordham 2004; Kadera and Sorokin 2004; Smith and Fontanel 2008). *Ceteris paribus*, the higher the level of such expenditures, the greater the quantity of military power and capabilities produced and possessed by a state. Countries with larger defense budgets produce and have at their disposal more military capabilities and military assets vis-à-vis countries with lower defense spending.[2]

Estimated at just under $70 billion in 2016,[3] the Russian defense budget is the third highest globally following the United States and China. It has steadily increased over the past decade and a half, on the one hand reflecting Russia's increasing geopolitical ambitions and active engagements in a number of regions of the world as it asserted its strategic role internationally and on the other, the rapid growth of the Russian economy which has provided the finances required to support a massive military modernization program (Cooper, 2016; Yakovlev, 2016). In particular, following the economically dismal decade of the 1990s when annual average GDP growth was –4.9%, the Russian economy rapidly recovered in the 2000s. It reversed the economic decline of the first post-bipolar decade and moved into a vigorous growth path. During 2000–2009, the average annual growth rate of GDP was 5.5%.[4] The vibrant growth rates, recorded during this period, were substantially driven by resource extraction and exports, predominantly of hydrocarbons (Voskoboynikov, 2017; Benedictow et al. 2013; Tuzova and Qayum, 2016; Cooper, 2013). Oil and natural gas earnings significantly contributed to the Russian economic recovery and growth performance and financed public expenditure including defense spending (Cooper, 2016; Sabitova and Shavaleyeva, 2015; Oxenstierna, 2016; Christie, 2017). This vibrant economic performance seems to have faltered in recent years (Berezinskaya, 2017; Medvedev, 2016; Kudrin and Gurvich, 2015). The growth rate in 2010–2016 declined to an annual average of 1.6%, a rather feeble performance compared to the previous decade (2000–2009). As Christie (2017) and Cooper (2016) note, the slowdown of the Russian economy can affect the military budget and Russia's ambitious ongoing military modernization program. Oxenstierna (2016) argues that the economic preconditions for further increases of such public outlays seem to have changed significantly in recent years given the faltering Russian economic performance. In a similar vein, Fal'tsman (2017) observes that fiscal constraints will affect the procurement of new weapons systems from the domestic arms industry and thus adversely affect this sector of the economy that has greatly benefited from the ambitious military modernization program that included the development and procurement of many technologically advanced weapons. Building on this, the present paper estimates a demand function for Russian military expenditure during 1992–2015 in order to identify its determinants and drivers and to quantitatively assess the association with the economy from where the resources allocated to defense are drawn. The next section offers a brief overview on modeling issues of the demand for military expenditure and

[2] However, it should be stressed that such an argument implicitly assumes that all countries use, with the same efficiency, the resources used in producing military power which is not necessarily the case as studies have shown (Beckley 2010; Biddle 2004; Biddle and Long 2004).

[3] Data from Stockholm International Peace Research Institute (SIPRI).

[4] Data drawn from the World Bank's World Development Indicators database.

discusses the determinants of such spending. The methodology employed and the findings are presented and discussed in section three, while section four concludes the paper.

2. Defense spending and the economy: a bird's eye view

A cohort of factors affects military spending and the decision-making process associated with the allocation of resources to defense and national security (Smith, 1980, 1989; Paleologou, 2015). Typical models of military expenditure begin with the standard welfare maximization behavior (Smith, 1980). Social welfare (W) is a function of civilian private consumption (C), demographic factors (N), national security (S) and other factors (Z), such as the ideological and political leanings of the incumbent government, so that:

$$W = W(C, N, S, Z) \tag{1}$$

Security (S) is a function of military expenditure (M), i.e. the costs of resources needed in order to produce military capabilities and strength, the military strength of other states (M_i) as this is reflected by their respective military expenditures as well as other strategic factors (X) that can affect the level of security (S) a given country enjoys:

$$S = S(M, M_1, \ldots, M_n, X) \tag{2}$$

The effect, exerted by the military strength of other countries ($M_1 \ldots M_n$), depends on whether they are friendly states, allies or rivals (Nordhaus et al. 2012). In the case of allies, the yearly defense allocations positively affect the level of security the given country enjoys. However, in empirical investigations, the sign of this effect on the defense budget cannot be predicted *a priori*. It depends on whether the given country adopts a follower mode vis-à-vis its allies or behaves as a free-rider. In the latter case, it reduces its own military spending since, for its defense, it relies on the security umbrella provided by the allies' military strength. On the other hand, if the states in (2) are adversarial and antagonistic powers, their military spending negatively affects the level of security (S). Hence, they will tend to cause increases in the defense budget of the given state in an effort to purchase more security. For instance, in the case of Russia, the USA can be construed as an antagonistic power in the global arena (Forsberg, 2014; Cooper, 2016). Including the estimations that follow US military spending will help to empirically trace one of the strategic considerations that may influence the allocation of resources to defense by Russia. Intuitively, one would expect a positive effect on the annual Russian defense budget. Less clear is the case of China, the other major player in the greater region as well as globally (Malle, 2017; Zabortseva, 2012). Although not overtly antagonistic to Russia, as probably the USA is, China is nevertheless an important strategic consideration that can exert a noteworthy influence in Russia's foreign and security policy. Including the defense expenditures of both these major powers in the empirical investigation will help shed light into the broader strategic factors that may be affecting Russian military spending. Of course, maximization of (1) is subject to the usual economic constraint that applies as a given government allocates scarce resources between defense and non-defense, civilian uses:

$$Y = p_c C + p_m M \tag{3}$$

where Y is income and p_c and p_m are the real prices for C and M, respectively. Given this, the general demand for the military expenditure function can be expressed as follows:

$$M = M\left(\frac{p_m}{p_c}, Y, N, M_1, \ldots, M_n, Z, X\right) \tag{4}$$

In applied studies that estimate demand functions, military expenditure is invariably expressed in shares of GDP. During the period in question (i.e. 1992-2015), Russia on average allocated 4% of GDP to defense annually. The political and strategic variables that can affect such public outlays are quantified through various indices (Bove and Brauner, 2016; Kauder and Potrafke, 2016; Dunne et al. 2003, 2008). For our purposes here and in line with the preceding discussion, the defense allocations of China and the USA are included in the estimations that follow in the next section in order to capture the effect of strategic considerations and needs that drive Russian military spending. National defense is the archetypical example of a public good. The possible public good effects of such spending are invariably captured through the inclusion of population in the estimated functions. Hence, we also opt to include population in our estimations. As has been shown, the ideological and political traits of the government influence foreign and defense policy and hence defense spending (Kollias and Paleologou, 2003; Albalate et al. 2012; Kauder and Potrafke, 2016). To this effect, the liberal democracy index (*LIBDEM*) of the *Varieties of Democracy*[5] project is introduced in the estimations. *LIBDEM* is a composite index that quantifies regime traits such as electoral democracy, rule of law and independence of judiciary (Pemstein et al., 2017).

The economic base from where resources are drawn to meet defense and foreign policy needs, is included in the estimated functions in the form of GDP growth rates. As an economy expands, more resources can be devoted to national security and defense if needed. As noted in a number of studies, the growth performance of the Russian economy financed the implementation of an ambitious military modernization and armament program that allows Russia to (re)assert its strategic role and presence in the international arena (Cooper, 2016; Oxenstierna, 2016; Christie, 2017). Fig. 1 shows Russian military spending in real terms[6] (Milex) over the period examined here. The sharp decline during the first post-Cold War decade is followed by an equally sharp increase in the annual defense budget. Both trends seem to be strongly associated with the growth performance of the Russian economy as reflected in the annual GDP change (GDP) in the figure. A decline of more than 60% in defense spending was the outcome of the shrinking economy in the 1990s. It more than tripled as a result of the vibrant growth performance that followed. As pointed out by Cooper (2016) and Christie (2017) amongst others, the vibrant

[5] https://www.v-dem.net/en/

[6] SIPRI data. In constant $2015 prices.

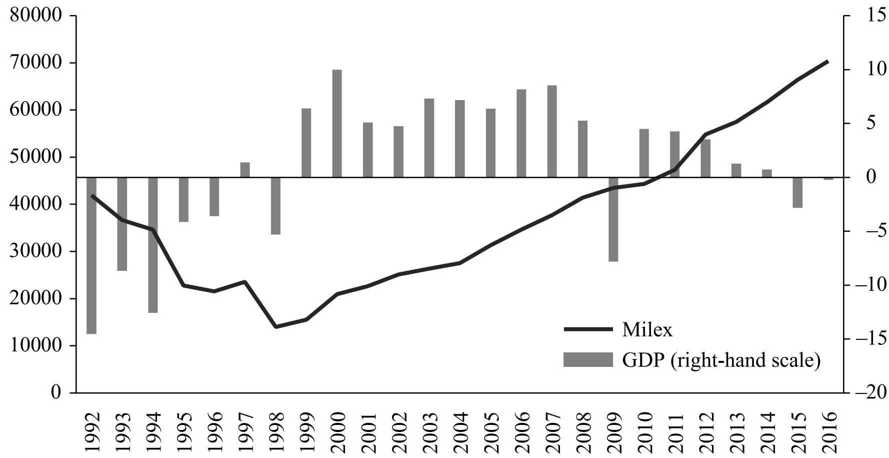

Fig. 1. GDP growth rates (%) and military spending (million 2015 USD).

economic performance of the 2000s helped finance the military modernization program of Russia. However, it is interesting to observe that the upward trend in defense spending seems to be unaffected thus far by the faltering growth performance of recent years. Nevertheless, as for example Oxenstierna (2016) and Cooper (2016) also stress, a continued slow-down in economic performance may eventually affect Russia's economy to finance its military build-up and military capabilities modernization program. Given that energy export earnings have significantly contributed to economic growth performance and have financed public expenditure (Sabitova and Shavaleyeva, 2015), it was decided to include this channel in the estimations that follow. Oil rents,[7] expressed as a percentage of GDP, increased from an average of about 4.8% during 1990–1999 to 11.1% and 9.1% during 2000–2009 and 2010–2015, respectively. As Sabitova and Shavaleyeva (2015) point out, the Russian federal budget is highly dependent on such earnings. From our perspective here, including this source of finance for public expenditure will help to investigate in a more comprehensive manner the dependency of Russian military spending on energy earnings. To this, we now turn in the section that follows.

3. Methodology and findings

Given the preceding discussion on the determinants of military expenditure and in line with the relevant literature, the demand for Russian military spending is expressed initially in the following linear framework:

$$RUSM_i = \beta_0 + \beta_1 GDP + \beta_2 POP + \beta_3 OIL + \beta_4 LIBDEM + \beta_5 USA + \varepsilon_i \quad (5)$$

$$RUSM_i = \gamma_0 + \gamma_1 GDP + \gamma_2 POP + \gamma_3 OIL + \gamma_4 LIBDEM + \gamma_5 CHINA + \eta_i \quad (6)$$

$$RUSM_i = \delta_0 + \delta_1 GDP + \delta_2 POP + \delta_3 OIL + \delta_4 LIBDEM + \delta_5 USA + \delta_6 CHINA + \zeta_i \quad (7)$$

[7] Data drawn from the World Bank's World Development Indicators database.

In (5), (6) and (7), *RUSM* is the dependent variable i.e. Russian military spending expressed as a share of GDP. In line with the discussion in the previous section, the explanatory variables include both strategic as well as economic determinants. *GDP* is the annual growth rate of the Russian economy, POP is the population in order to capture the possible public good effects of such spending, *LIBDEM* is the political color indicator. *USA* and *CHINA* are the strategic determinants of Russian military spending in the form of their respective defense expenditure expressed as a share of GDP[8]. Finally, *OIL* are the oil rents in order to examine whether and to what extent income from energy exports has acted as a source of finance for the Russian defense budget as argued in a number of previously cited studies. To allow for better insights, three OLS relationships were estimated. In (5), only *USA* is included as an external strategic determinant of *RUSM*, in (6), it is replaced by *CHINA* and in (7), both are included. However, given the limitations of OLS estimations and in order to capture underlying nonlinearities, we will apply the generalized additive mixed models (GAMMs). Employing GAMMs, not only do we have an extension of the generalized linear mixed model but we can also test the nonlinearity among the dependent variable and one or more independent variables via a large array of methods (Baayen et al., 2016). As pointed out in the relevant literature, GAMMs provides a functionality for distribution patterns, taking into account the correlation construction in grouped data and gives the opportunity for the non-linear relationship (Wood, 2006a; 2006b). Wood (2000, 2004, 2006a, 2006b) defines the GAMMs model as follows:

$$v_i = \boldsymbol{\theta Y}_i + z_{1i} f_1(p_{1i}) + z_{2i} f_2(p_{2i}) + z_{3i} f_3(p_{3i}) + \ldots + \boldsymbol{bX}_i + u_i \tag{8}$$

In equation (8) v_i denotes the response variable, whereas $\boldsymbol{Y}_i$ is the parametric part. Furthermore, the z_{ji}*'s* and the f_j*'s* are the smooth functions of the variables involved. In addition, $\boldsymbol{X}_i$ shows a row of a random effects framework matrix and u_i is the residual error vector. Wood (2006a, 2006b) points out that by implementing tensor product smoothers for all the covariates, we can estimate our model. Interesting to observe is that this method is functional when the covariates are applied in distinct units and the comparative escalation is random (Wood et al., 2013). In light of the aforementioned aspects, our goal is the reaction of the dependent variable compared to the (non-linear) independent variables. Hence, the three linear relationships above can be expressed as follows:

$$RUSM_i = \beta_0 + f_1(GDP) + f_2(POP) + f_3(OIL) + f_4(LIBDEM) + \\ + f_5(USA) + u_i \tag{9}$$

$$RUSM_i = \gamma_0 + f_1(GDP) + f_2(POP) + f_3(OIL) + f_4(LIBDEM) + \\ + f_5(CHINA) + u_i \tag{10}$$

$$RUSM_i = \delta_0 + f_1(GDP) + f_2(POP) + f_3(OIL) + f_4(LIBDEM) + \\ + f_5(USA) + f_6(CHINA) + u_i \tag{11}$$

8 All data on military spending are drawn from the SIPRI database.

Just as before in (9), (10) and (11), *RUSM* is the dependent variable, whereas f_j are (nonlinear) smooth functions of the covariates p_k (*GDP*, *POP*, *OIL*, *LIBDEM*, *USA* and *CHINA*). Additionally, applying cross validation we can evaluate the degree of smoothness for the f_j and, by employing penalized regression splines, we test the regression. As a pre-testing analysis (Table 1), we utilize the conventional unit root tests to check the time series properties of the variables involved. To this effect, we use the Dickey and Fuller (1979) unit root test (ADF) and the Phillips and Perron (1988) test (PP) on the logarithmic levels and logarithmic first-differences for all variables. As can be seen in Table 1, all the covariates of our sample are integrated of order one. Following the unit root tests, we proceeded with the estimation of the demand function for military spending. Table 2 presents the results from estimating both the OLS functions as well as the GAMMs grouped in pairs in terms of the strategic determinant (*USA* or *CHINA*).

As a broad and general observation, the findings are fairly consistent and in line with what one would intuitively expect by rendering empirical support to recent studies that address issues associated with Russian military spending and its military modernization program (Cooper, 2016; Christie, 2017; Oxenstierna, 2016). They strongly indicate that Russian defense spending has been driven by both economic and strategic considerations. This is the general conclusion supported by the GAMM findings rather than the OLS estimations where the results are less consistent as a cursory inspection of Table 2 reveals. Both estimation methodologies point to a strong public good effect as captured by the sign and significance of the population variable (*POP*). The GAMM results suggest a statistically significant positive effect by both US and Chinese military spend-

Table 1
Unit root tests results.

	RUSM	GDP	POP	OIL	LIBDEM	USA	CHINA
Level							
ADF	–1.00 [2]	–2.10 [2]	–2.90 [2]	–1.53 [2]	–1.93 [2]	–2.10 [2]	–1.96 [2]
PP	–3.39 [2]	–8.78 [2]	0.35 [2]	–10.84 [2]	–7.33 [3]	–6.80 [3]	–15.85 [2]*
First difference							
ADF	–3.67 [2]**	–4.86 [2]***	–3.53 [2]*	–3.51 [42]*	–3.71 [2]**	–3.86 [2]**	–3.36 [2]*
PP	–27.21 [2]***	– 29.06 [2]***	–23.19 [2]**	–22.31 [2]**	–30.45 [2]***	–27.17 [2]***	–24.90 [2]**

Note: ***, ** and * denote significance at 1%, 5% and 10% respectively. Numbers in square brackets are selected lags.

Table 2
The demand for Russian military expenditure. Findings from OLS and GAMMs estimations 1992–2015.

	(5)	(9)	(6)	(10)	(7)	(11)
	OLS	GAMMs	OLS	GAMMs	OLS	GAMMs
constant	–0.671***	0.040***	–0.423***	0.040***	–0.077***	0.040***
GDP	–0.04	2.515	–0.074***	3.363***	–0.0377	3.524**
POP	0.058***	1.949***	0.003***	1.923***	0.005***	1.000***
OIL	–0.045	3.362***	0.01	3.508***	–0.041	3.382***
LIBDEM	–0.154***	1.011***	–0.113***	1.000***	–0.172***	1.000***
USA	0.358	1.000*	–	–	0.493*	1.000***
CHINA	–	–	–0.184	1.635	–0.555	1.545**
R^2	0.749	0.9	0.721	0.907	0.768	0.925

Note: ***, ** and * denote significance at 1%, 5% and 10% respectively. Numbers in square brackets are selected lags.

ing variables included in the estimations. In particular, the *USA* coefficient is positive and significant in three out of the four estimations where it is included. The only exception is the OLS estimation of (5). Less consistent is the finding for *CHINA*. The coefficient is statistically significant only in (11), the GAMM estimation, where both the US and Chinese defense expenditures are included as external strategic determinants of Russian military spending. Interpreting the positive sign of this coefficient is probably easier in the case of the US compared to China. In the case of the US, it probably reflects antagonistic strategic interests, a possible remnant of the bipolar period carried over in the new multipolar international environment. As Russia attempts to re-assert its strategic role and interests internationally, this requires a significant military build-up vis-à-vis the dominant military power globally (Yakovlev, 2016; Cooper, 2016). Greater military strength, along with increasing power, allows Russia to affirm its role and importance in international affairs and credible presence in a number of volatile regions such as Syria. The interpretation of the positive and significant coefficient in the case of the Chinese military spending in (11) can be twofold. On the one hand, one may tentatively argue that it possibly reflects a follower mode of behavior as both rising powers assert their presence in the international scene (George et al. 2018). Military strength is a credible vehicle through which a state's presence and role in the international geopolitical scene is affirmed. On the other hand, however, since Russia and China are not in the strict sense of the word allied powers, the positive coefficient may also reflect an effort by Russia not to lag behind the ongoing Chinese military build-up since both powers have strategic interests in the same broad geopolitical region that are not necessarily compatible.

Turning to the two economic determinants included in the estimations, the GAMMs results clearly point to a statistically strong dependence of Russian military spending on income from energy exports (*OIL*). The coefficient yielded by the estimations is consistent throughout all three estimated GAMMs functions—i.e. (9), (10) and (11). This finding is in line with literature that points to a strong dependence of the federal budget in general and defense spending in particular on energy earnings and offers empirical support to the arguments developed therein (Sabitova and Shavaleyeva, 2015; Oxenstierna, 2016; Christie, 2017; Cooper, 2016). Such earnings are susceptible to the fluctuations of the international energy markets and international energy prices. It follows that, if energy earnings decline, this inevitably will generate pressures on the Russian defense budget as well as the broader fiscal position of the federal budget. In comparative terms, less consistent are the results for the GDP growth rate variable. Nevertheless, they also point to a strong positive non-linear association between defense spending and the growth performance of the Russian economy as the GAMMs results of (10) and (11) indicate.

As already noted above, the use of GAMMs allows for the presence of a non-linear relationship between the dependent variable and one or more of the independent variables (Baayen et al., 2016). Hence, they offer the opportunity for better insights into the complex structures that govern military spending and its determinants that include strategic as well as economic factors. Such expenditure is invariably driven by national security and strategic considerations affected by the regional or global geopolitical environment but ultimately, just as for any other form of public spending, is subject to the inevitable economic constraint. That is, the ability of the economy to allocate the necessary resources into the production of military capabilities that are a pivotal part of a countries' strength (Arvanitidis and Kollias, 2016). However, given the small number of observations of the timeseries used here, the use of the GAMMs methodology and the concomitant results that the estimations yield should be treated cautiously[9] given that they are a better suited methodology for appreciably larger number of observations. In view of this limitation, it was decided to employ the quadratic match-sum pattern in order to transform all the annual series into quarterly data, i.e. to increase the number of observations that enter the estimations. Thus, the problem of using GAMMs with a small number of observations is at least partially offset without losing the advantages of using this methodology to probe into the complex and often nonlinear relationship that governs military spending and its determinants. The quadratic match-sum pattern is a methodology that has been used in a number of recent studies afflicted by small sample sizes (Borjigin et al., 2018; Shahbaz et al., 2017; Shahbaz et al., 2018)[10]. The outcome of applying this procedure is that, in our case, the new dataset consists of 100 observations for each of the series involved. Then, using this new dataset generated from applying the quadratic match-sum pattern methodology, we re-estimate the same equations as the ones in Table 2 above. The new findings both from the OLS and GAMMs estimations are presented in Table 3. On the whole, they do not differ in any meaningful and noteworthy manner from the previous ones reported earlier. Once again, it appears that both domestic and external factors drive Russian military expenditure. The new estimations reaffirm the public good effect as captured by the sign and significance of the population variable (POP). More importantly though, the statistically strong effect of the two economic variables (GDP and OIL) is affirmed by the results reported in Table 3. A similar statistically significant and posi-

Table 3
The demand for Russian military expenditure estimations following the quadratic match-sum pattern transformation of the data series.

	(5)	(9)	(6)	(10)	(7)	(11)
	OLS	GAMMs	OLS	GAMMs	OLS	GAMMs
constant	–0.674***	0.040***	–0.413***	0.040***	–0.076***	0.040***
GDP	–0.060***	3.059 (7.69)**	–0.060***	3.939 (1.18)***	–0.060***	3.741 (4.85)***
POP	0.050***	2.294 (9.83)***	0.030***	3.732 (8.35)***	0.057***	2.734 (2.65)***
OIL	–0.020*	2.737 (1.09)	0.078	3.703 (3.69)*	–0.023	2.099 (1.98)**
LIBDEM	–0.152***	3.569 (5.84)***	–0.111***	2.123 (5.979)***	–0.168***	1.981 (12.11)***
USA	0.364***	3.699 (5.766)***	–	–	0.487***	3.990 (8.64)***
CHINA	–	–	–0.172	2.379 (2.939)**	–0.528**	3.393 (5.29)***
R^2	0.724	0.935	0.693	0.822	0.742	0.894

Note: ***, ** and * denote significance at 1%, 5% and 10% respectively. Numbers in square brackets are the degrees of smoothness of functions f_i.

9 We sincerely thank an anonymous reviewer for drawing our attention to this important issue.

10 In a nutshell, as noted by Shahbaz et al. (2018), what the quadratic match-sum method does is to fit a local quadratic polynomial for each observation of the original annual time series. Then, the fitted polynomial is used to fill in the higher frequency observations, in this case the quarterly time series constructed for our purposes here.

tive effect is exerted by the USA and CHINA variables. As pointed out earlier, the positive sign of the US coefficient points to an antagonistic relationship between the two major military powers of the world. For Russia, (re)asserting its international strategic role necessitates a strong military pillar vis-à-vis the US or other major strategic players globally. Once again, in the case of the coefficient for China, a twofold explanation can be postulated: either a broad follower mode of behavior adopted by Russia as both rising powers are asserting and establishing their political and military presence and role in international affairs often in a loosely cooperative manner and/or an effort by Russia not to lag behind the massive Chinese military build-up fueled by the rapidly growing Chinese economy (Robertson and Sin, 2017).

Finally, as a further step in the analysis and as a test of robustness, the nonparametric effects of the determinants of Russian military expenditure are graphically shown in Figs. 2, 3 and 4. In the figures, Russian defense spending is on the vertical axis of the diagrams and the other covariates on the horizontal axes. The solid black curve passes via the mean values of the nonlinear regression coefficients. The gray section denotes a 95% confidence band. The robustness and consistency of the findings is a noteworthy aspect of the figures. A careful visual inspection reveals fairly similar behavior of all the explanatory variables in all three figures. For example, the two economic variables — *GDP* and *OIL* — that are the sources of financing the Russian defense budget. Similarly, the effect exerted by US military spending on Russian defense expenditure as depicted in Figs. 2 and 4.

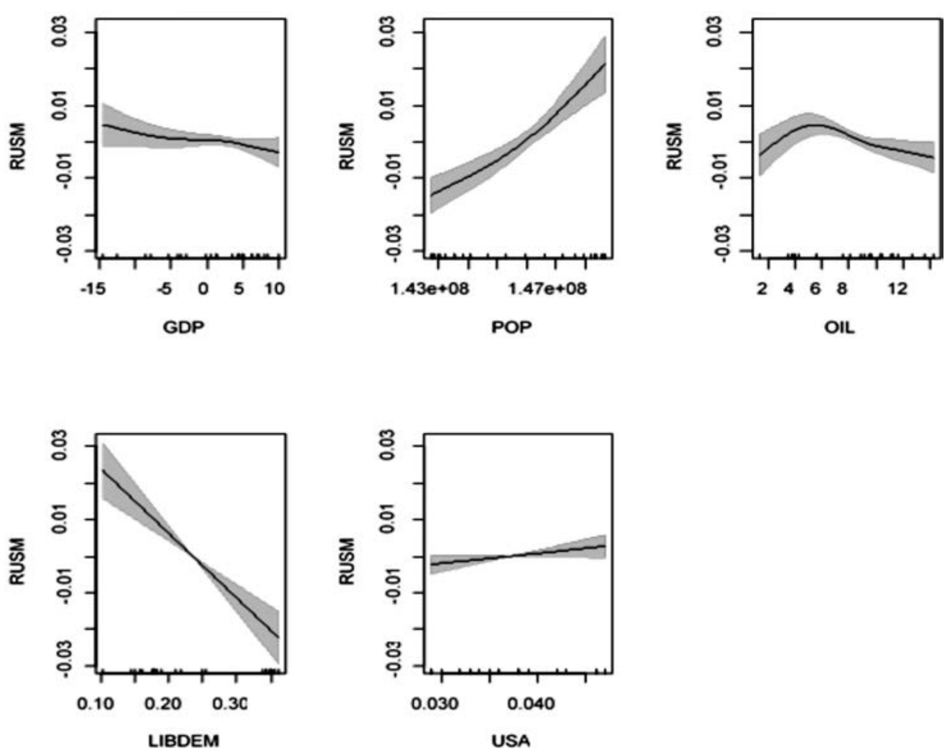

Fig. 2. Nonparametric additive regression (model 1).

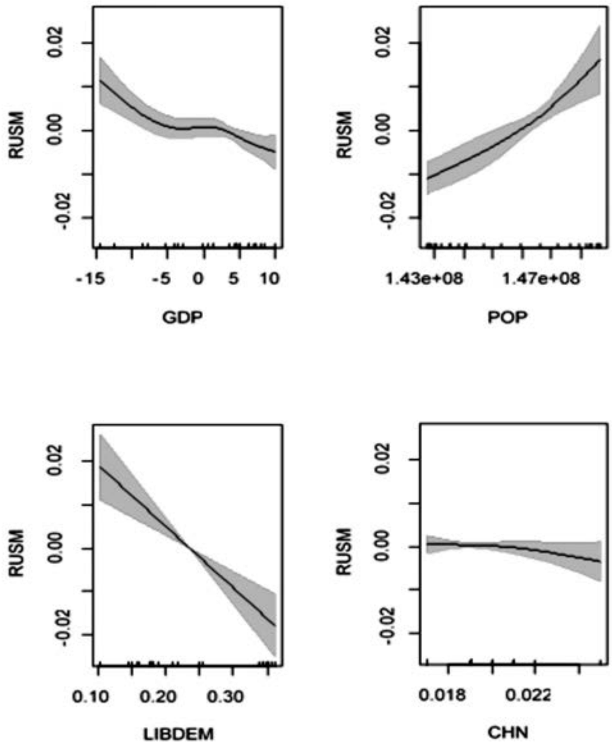

Fig. 3. Nonparametric additive regression (model 2).

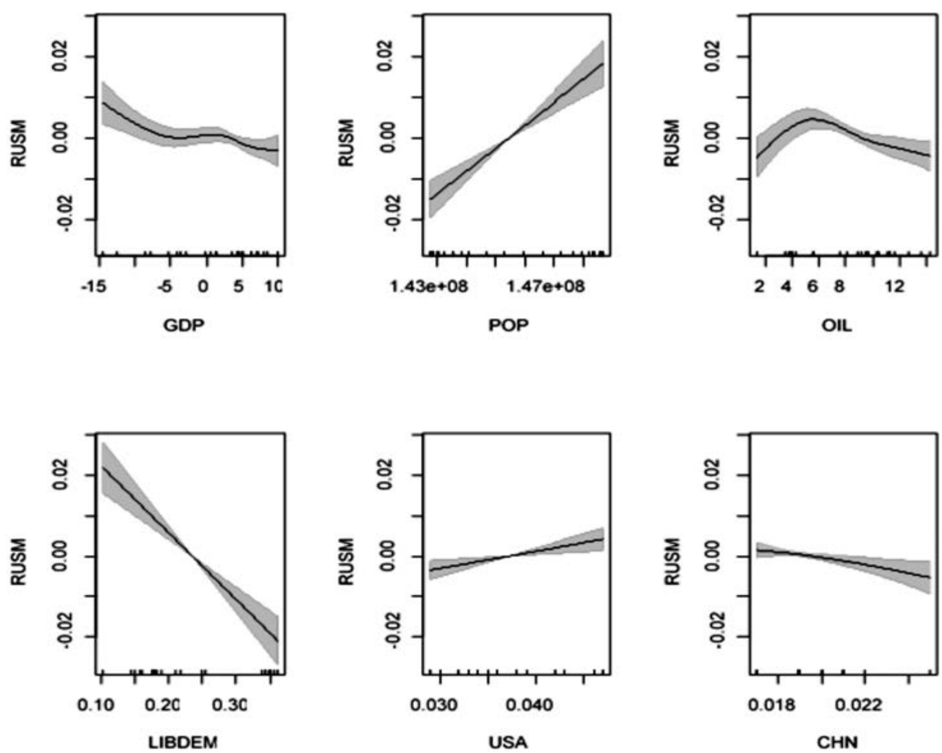

Fig. 4. Nonparametric additive regression (model 3).

4. Concluding remarks

A cohort of economic, political and strategic factors influences the allocation of resources to defense. Following a dismal, in economic terms, first post-Cold War decade, the vibrant growth performance of the Russian economy siphoned resources to the Russian defense budget that allowed the implementation of an ambitious military modernization program as Russia (re)asserted its presence in regional and global affairs (Cooper, 2016; Oxenstierna, 2016; Christie, 2017). The results of the estimated demand function for Russian military spending reported herein, empirically verify the strong dependence of such spending on economic factors that include income from energy earnings. The findings render empirical support to the argument that the faltering economic performance of recent years can eventually impact Russia's defense budget, adversely affecting its military modernization program. Fiscal strains may also arise if the rapid increase in defense expenditure is maintained without the economic preconditions that allowed for the rise in military spending during the previous years.

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