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Motives of territorial allocation of Japanese development aid: self-interest, altruism or merit?

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Abstract

The paper analyses the factors affecting the territorial allocation of Japanese development aid. After reviewing 12 available empirical studies with some inconsistent results, we applied a regression analysis for a recent and relatively long period (1994–2014). The analysis has three main conclusions. First, Japan's interests tend to be a relatively less important factor than found in other studies, and of those factors the role of trade may have diminished recently. Second, there is a middle-income effect in Japan's allocation, indicating only moderate support for the recipient countries' needs hypothesis. Third, Japan tends to reward countries that have better governance and a higher level of freedom and democracy.

Key words: Official development assistance; foreign aid allocation; aid donor; Japan; panel data regression analysis

Introduction

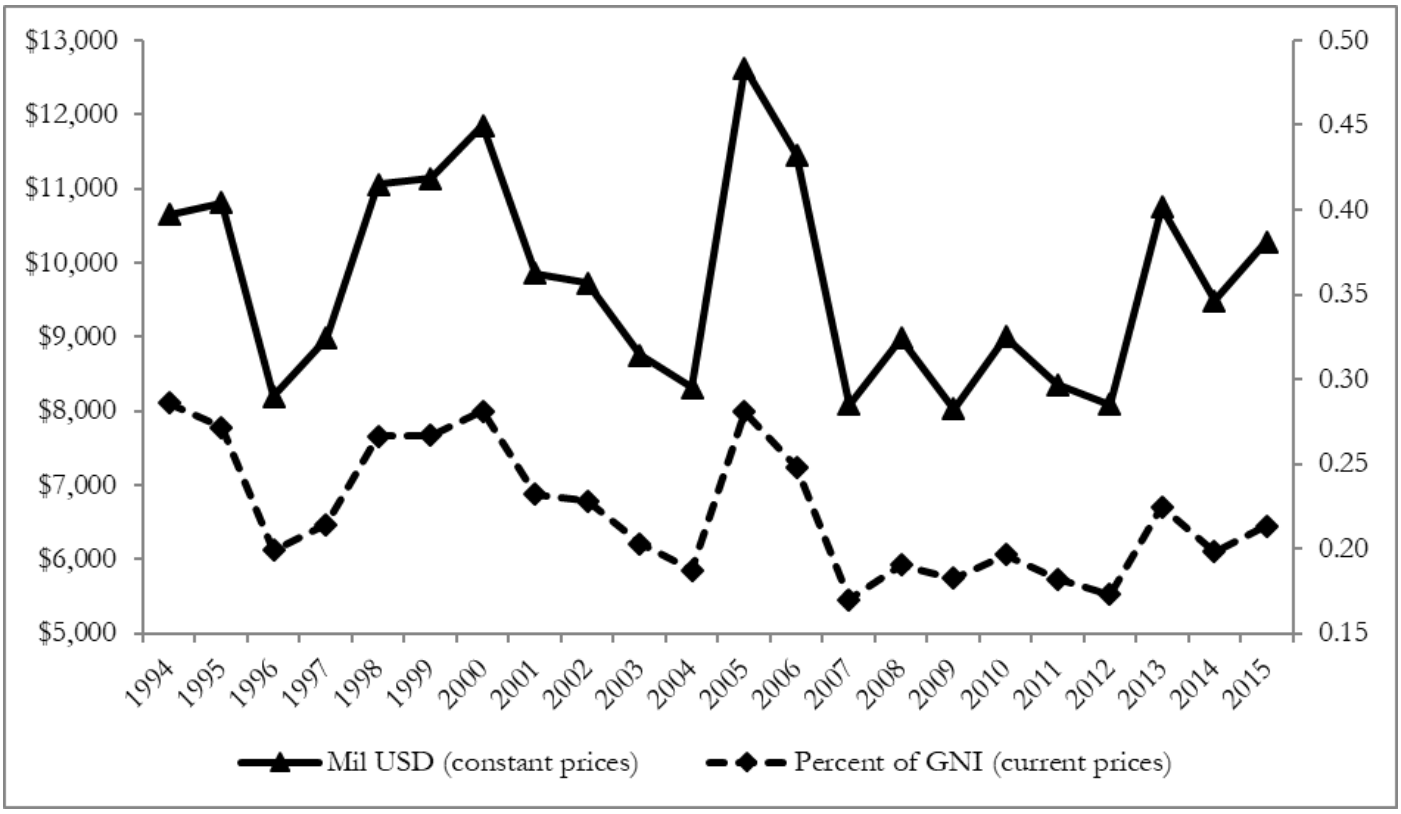
This paper attempts to shed light on the factors affecting the allocation of Japanese development aid. In terms of the amount of development aid provided, Japan is one of the largest global donors. Factors that affect the territorial allocation of Japanese aid are therefore important, not only from the perspective of Japanese foreign policy, but also globally. Although there are more than ten empirical studies on the factors affecting Japanese aid allocation, there is no clear consensus on the role of some of the factors. Our study contributes to the evidence concerning the factors affecting Japanese aid allocation as it uses more up-to-date data than any other research we are aware of. Also, we use a relatively long recent period (1994–2014) to identify the significance of the factors.

The paper is structured as follows. In the following part of this section we provide a short overview of Japanese aid, its quantity and territorial allocation. In section two we review the literature relating to the factors affecting aid allocation and the methods commonly used in aid allocation studies. In the research part of the paper we describe our variables and data and justify the selection of our model (section three). We then summarise the results of the regression analyses (section four). In the final part (section five) we compare our results with those from previous studies.

Japan is a donor country in the group the Development Assistance Committee of the Organisation for Economic Co-operation and Development (OECD/DAC). In 2015 Japan provided 9,203 mil USD (current prices) as net Official Development Assistance (ODA), the most common definition of development aid (all data that follow in this section are from OECD, 2016b). In terms of absolute quantity, Japan was the fourth largest donor out of 28 OECD/DAC member countries, representing about 7 percent of the group's total ODA. A less clear picture emerges when the aid is expressed in relative terms, as a percentage of a donor country's Gross National Income (GNI). In 2015 Japan provided 0.21 percent; a significantly lower share than the OECD/DAC country average of 0.41 percent, placing Japan in 18th place.

The evolution of Japan's aid flows over the last two decades is illustrated in Figure 1. The annual amount of Japan's aid fluctuated between 8,000 and 13,000 mil USD (constant prices), but with no clear trend over the period. The ODA/GNI percentage has generally followed the absolute aid quantity with no clear trend overall, but the second half of the period shows a lower percentage than the first half (in spite of the 2005–2006 peak from the second period).

Figure 1: Japan's ODA (1994–2015)



Source: based on data from OECD (2016b).

Most of Japan's ODA is provided on a bilateral basis (rather than multilateral); in 2015 Japan provided almost 75 per cent of its aid bilaterally (6,872 mil USD out of the total 9,203 mil USD). Just taking into account the bilateral aid allocations, the largest share of aid was

provided to South and Central Asia (2,600 mil USD; 38%) and to Sub-Saharan Africa (1,585 mil USD; 23%). It is also worth noting that a significant part of Japan's bilateral aid is unspecified, either by country or by region. The largest recipients were Viet Nam (1,201 mil USD; 17%), India (970 mil USD; 14%), Bangladesh (419 mil USD; 6%), Myanmar (392 mil USD; 6%) and Iraq (364 mil USD; 5%). The allocation to these five countries constituted almost half (49%) of Japan's total bilateral aid.

What do we know? A short review of literature on factors of (Japanese) aid allocation

The factors affecting aid allocation are usually divided into three basic groups. The first group of factors is denoted as donors' interests. To a substantial extent this category reflects the selfish motives of aid allocation. The factors in this group are usually related to measures of bilateral trade with recipient countries or to the donors' exports to recipient countries (for example, Alesina and Dollar, 2000; Berthélemy, 2006; Canavire et al., 2005; Lundsgaarde et al., 2010). Additionally, variables describing special relations between a donor and a recipient are also used in this regard, such as dummy variables for common colonial links (Schraeder et al., 1998 and many others), for special Japanese ties to Asia (Bethélemy, 2006) and for US special ties to Egypt and Israel (Alesina and Dollar, 2000). Variables measuring geographic proximity (Collier and Dollar, 2004), language proximity (Lundsgaarde et al., 2010), religious, cultural and historical proximity (Alesina and Dollar, 2000;Younas, 2008; Opršal et al., 2016) between a donor and a recipient also fall into this category. It is predicted that the more intense the donors' interests are and the closer their mutual relationships, the higher the volumes of aid from the donor to that particular recipient will be. This theory is usually confirmed by empirical results.

Additionally, one specific factor is often used in regression studies as a potential factor in Japanese aid allocation – the importance of US security and economic interests. This is called the Gaiatsu hypothesis, according to which Japan has followed US interests in its aid allocation, particularly during the Cold War and in the first half of the 1990s. While it is often classified as a specific factor, we understand it as part of the broader framework of Japan's political interests.

The second group of factors measures recipient countries' need for aid. This category reflects the altruistic motives of aid allocation. The factors in this group can be divided into two major groups. The Economic needs of recipients are usually measured by the level of economic development; by GDP per capita or similar variables (Harrigan and Wang, 2011 and many others). Social needs are captured by indicators of social development, such as infant mortality rate (Berthélemy and Tichit, 2004), caloric intake (Schraeder et al., 1998) and literacy rate (Lundsgaarde et al., 2010). The total population must also be taken into consideration, as poor recipient countries with larger populations (larger than what? or which countries?), ceteris paribus, are likely to require higher absolute amounts of aid (Neumayer, 2003). Theories predict that higher volumes of aid are associated with greater recipients' needs (Berthélemy, 2006 and many others). The empirical evidence supports the theory of altruism in aid allocation when approximated by economic factors. However, this is much weaker with regard to social factors.

Recently, institutional and/or political factors have been identified as a third group of factors in aid allocation. This category of factors reflects both the merits of aid allocation (for example Hoeffler and Outram, 2011) as well as the effectiveness of aid (Burnside and Dollar, 2000). This group of factors is operationalised by indicators which measure various aspects of institutional quality and political development. The most common are the different sub-indices of (or the average of) the Worldwide Governance Indicators (Opršal et al., 2017), the level of civil liberties and political rights (Berthélemy and Tichit, 2004), and the type of political regime (Lundsgaarde et al., 2010). According to theories, donors might have a tendency to reward the better institutional and political performance of recipients as well as more democratic and freer countries with higher volumes of aid. This argument is also supported by the influential study by Burnside and Dollar (2000), according to which, the quality of recipient countries‘ institutions has a positive influence on aid effectiveness. Donors should therefore reward the better institutional performances of recipients with higher volumes of aid. However, the empirical results do not always fully confirm theoretical predictions. One reason for this can be linked to the problems of the approximation of institutional quality or political development with data. For example Canavire et al. (2005) argued that the significance of institutional quality for aid allocation varies according to the variables that are used to measure it.

In the rest of this section, we review the results of studies into Japanese aid. Schraeder et al. (1998) investigated the aid allocations of four donors, including Japan, to 36 countries in Africa and found that economic self-interest was a key determinant in Japanese foreign aid toward Africa during the period under review. However, they also detected some support for the recipient needs hypothesis. According to the authors, Japanese aid was directed to the poorer African countries, albeit those with better health and other social conditions. Similarly, Alesina and Dollar (2000) examined the aid allocations of 21 donors (including Japan) to 180 recipient countries over the period 1970–1994. They found that Japan seems to mostly care about its own political and economic interests, does not reward good policies nor institutions and is less sensitive (than other donors) to the income level of the recipients (in fact, according to the authors, Japanese aid allocation has one of the lowest elasticities to income). Canavire et al. (2005) analysed the aid allocations of nine donors, including Japan, in 1999, 2000, 2001 and 2002 and concluded that Japanese aid was driven by selfish export-related motives, and there was only a weak orientation to the poverty levels and policies of recipient countries.

Berthélemy and Tichit (2004) investigated the aid allocation of 22 donors (including Japan) to 137 recipient countries over the period 1980–1999, and reported the Japan gave more aid to its trading and investment partners than most other large donors did. Using the same sample data, but a different analytical approach, Berthélemy (2006) reported Japan to be a „moderately egoistic“ donor because the trade parameters were not significantly different from those of other donors. However, when the Asian dummy was dropped, the Japanese trade parameter became significantly different, and Japan was denoted as an ”egoistic“ donor. Younas (2008) particularly focused on the role of different types of Japanese exports in aid allocation. He found that Japan provided more aid to recipients who

imported Japanese machinery and transportation equipment. He also observed that Japanese aid was directed towards countries receiving more aid from multilateral and other bilateral donors as well as countries with smaller populations. No religious affinity was found to play a role in Japanese aid allocation.

Harrigan and Wang (2011) analysed aid allocations from seven donors, including Japan, to 153 recipient countries over the period from 1966–2008 and found that Japanese aid was not oriented toward the recipients' needs. However, a different analytical approach by the same authors did not confirm their original results, and showed Japanese aid was also driven by recipients‘ needs. Other papers reveal that Japanese aid allocation is based on altruistic motives as well as factors of merit. Angeles et al. (2008) examined the allocations of seven donors to 104 recipient countries over the period 1984–2003. Although they concluded that less altruistic motives such as commercial interests played a role in Japanese aid allocation, they also found that Japanese aid was significantly more oriented toward poor countries‘ needs in the post-1998 period. The same was true for Japanese aid selectivity based on institutional quality, i.e. developing countries with better institutions received more aid, especially after 1998.

Tuman and Ayoub (2004) investigated Japanese aid flows to 35 recipient countries in Africa over the period 1979–1998. They concluded that Japan allocated its aid to poor countries, countries at a greater risk of food insecurity and to countries with a greater respect for human rights (that is, the recipients' needs were taken into account), while aid was only partly used to support Japanese trade. The authors also discovered a link between US security interests and Japanese aid allocation, while no such links were detected in relation to US economic initiatives in Africa. In their reappraisal of 86 recipients over the period 1979–2002, Tuman et al. (2009) found that Japanese aid allocation was strongly determined by the recipients' needs, while the Gaiatsu hypothesis was only partially supported. Remarkably, they also ascertained that Japanese economic interests had the opposite effects to those expected: Japanese aid went to poorer countries that did not trade with Japan and that were not oil exporters.

Cooray et al. (2005) analysed Japanese aid allocation to 96 recipient countries over the period 1981–2001 and revealed that Japan took its own interests as well as the recipients' needs into account. They also discovered income and population biases in the Japanese aid allocation (aid increased with the recipients' per capita income and populations up to a threshold, and then it decreased), as well as a bias toward Asian countries. Katada (1997) examined Japanese aid flows to 19 recipient countries in Latin America and the Caribbean over the period 1975–1991 and found that the flows were especially driven by Japanese political interests and, to a lesser extent, by economic interests. Interestingly, the trade factor lost its importance in the later sub-periods. The Japanese aid allocation also reflected US interests: it supported US economic interests, but left US political interests unsupported. Japan also directed more aid toward the poorer, more open and less populated countries in the region. A summary of the main conclusions of these articles as well as the methods they used is provided in Appendix 1.

Data and Methods

The aim of the empirical part of our research is to find what factors are significant determinants of the territorial allocation of Japanese ODA in 156 developing countries over the period 1994–2014. We also want to compare our findings with the conclusions of studies mentioned in the previous section and find whether the factors approximating Japanese interests in recipient countries (selfish motives), the recipient countries' needs (altruistic motives) and the merit motives are significant determinants of Japanese aid allocation.

We define developing countries according to OECD DAC as countries that were eligible recipients of ODA at any time over the defined period (OECD, 2016a). We make use of panel data with a cross-section element from 156 countries and with a time frame of 21 years. This potentially produces 3,276 data points (156 times 21) for each variable. However, as there are missing data for many variables, our models work with about 2,500 observations. In the first part of this section (3.1) we describe our dependent variable, the explanatory variables, and the data. We then (3.2) discuss our choice of the appropriate model.

Dependent variable, explanatory variables and data

The dependent variable is the volume of Japanese gross ODA at the constant prices of 2014 (in millions USD) disbursed to individual countries as recorded by the statistical database OECD.Stat (OECD, 2016b). We use the variable in a logarithmic transformation to reduce its skew and limit the risk of possible heteroscedasticity. We ignore the small amount of zero observations on the dependent variable (around 10%), which were lost because the logarithm of zero is not defined.

In accordance with the theory discussed above, we divide our independent variables into three groups. The first group contains variables approximating Japanese interests in a given developing country and variables which reflect relations between Japan and a given recipient (selfish motives). The second group includes variables that represent the recipients‘ needs for aid, approximated by their economic and social characteristics (altruistic motives). The third group of variables measures the factors of merit in Japanese aid allocation; the recipients' institutional quality and their level of political development.

The first group of variables includes a measure of Japanese export to each individual recipient country as a proportion of total Japanese GDP. Data were obtained from Comtrade database (United Nations, 2016). As these data are in USD at current prices, we use the US GDP deflator (World Bank, 2016a) to recalculate them to the constant prices of 2010. Then we divide the export variable at constant prices by Japanese GDP at the constant prices of 2010 (World Bank, 2016a). To measure the trade interests differently, we include a dummy variable which indicates whether a particular recipient country is an oil exporter (UNCTAD, 2016). To account for Japanese geo-political interests as well as for a possible Asian bias in Japanese aid allocation, we include a dummy variable which indicates whether a recipient is an Asian country or not, based on the World Bank's classification of

countries (World Bank, 2016b) but excluding Middle Eastern countries. We also work with a 'non-capitalist' dummy variable which indicates whether a recipient country was a member, an associate member, an observer or closely cooperated with The Council for Mutual Economic Assistance (COMECON) before 1989 (Zwass, 1989). We hypothesize that the volume of Japanese aid allocation should increase with higher volumes of exports and that it should be higher for countries that are oil exporters, for Asian countries and for non-members of COMECON. We also include total gross US aid flows as a control for at least one Gaiatsu factor. By doing this we examine whether US aid allocation is a determining factor in Japanese aid allocation.

The second category of variables represents the recipient countries' needs. We use the recipient countries' GDP per capita (in purchasing power parity, at constant international dollars of 2011; in natural logarithm) as an approximation of the economic needs. We also include the square of ln of GDP per capita to account for a possible income effect where aid first increases with recipients' income up to a point and then decreases. Data for the GDP per capita variable were obtained from the World Bank (2016a). To approximate the social needs of recipient countries, we use mortality of children under five years of age (World Bank, 2016a). In this context, we hypothesise that higher social needs should lead to more aid. However, the empirical research shows that the social variables are often insignificant (for example Younas, 2008; Cooray et al., 2005). Because we use absolute aid allocations as our dependent variable, we have to use a control for the total size of recipient countries' populations. We therefore include total population of recipients among the regressors and hypothesise that countries with larger populations receive larger absolute volumes of aid (ceteris paribus).

The third group of variables reflects the merit in Japanese aid allocation. It is assumed in this respect that donor countries reward better institutional and political performances of recipient countries by providing them with more aid. This in turn should also lead to the higher effectiveness of aid (Burnside and Dollar, 2000). We use the average of six Worldwide Governance Indicators (WGI) as the measure of institutional quality of recipient countries. We obtained the data from the World Bank (2016c). We are also interested in whether Japan rewards more democratic (or freer) countries by providing them with more aid. We measure the level of freedom and democracy by the Freedom in the World Index, which is the average of two indices: the index of political rights and the index of civil liberties (Freedom House, 2016). In a similar manner, we want to find if Japanese aid allocation rewards better economic performances of recipient countries. Therefore we incorporate the annual GDP growth of recipient countries (data from World Bank, 2016a) into our analysis. The variables used in our analysis are summarised in Fig. 1.

Fig. 1 – Description of variables

Code	Description	Unit	Source
ln_aid	Japanese Official Development Assistance (ODA) (to a given recipient country)	millions of USD, gross ODA disbursements, constant prices 2014	OECD (2016b)
gdp_pc (ln, L1)	GDP per capita (of recipient countries)	international dollars in purchasing power parity, constant prices 2011	World Bank (2016a)
l n _ g d p _ p c _ 2 (L1)	Square of the ln of gdp_pc	square of the ln of international dollars in purchasing power parity, constant prices 2011	World Bank (2016a)
u5mort (ln, L1)	Under-five mortality rate (of recipient countries)	deaths (of children younger than 5 years) per 1,000 live births	World Bank (2016a)
popul (ln, L1)	Total population (of recipient countries)	number of inhabitants	World Bank (2016a)
export_gdp_cp (ln, L1)	Japanese export (to a given recipient country) as a share on Japanese GDP	percentage (%): Japanese export to a country (USD, constant prices 2010)* as a share on Japanese GDP (USD, constant prices 2010)	United Nations (2016) World Bank (2016a)
freedom (L1)	Index of Freedom (of recipient countries)	index, average of two sub-indices: political rights and civil liberties, values from 1 (most free) to 7	Freedom House (2016)
avg_wgi (L1)	Worldwide Governance Indicators (WGI) (of recipient countries)	average of six sub-indicators, values from −2,5 (worst) to 2,5 (best)	World Bank (2016c)
us_oda1 (ln, L1)	Total US ODA (to a given recipient country)	USD, gross ODA disbursements, constant prices 2014 (*all values increased by 1 USD so that the log of the variable does not create many missing values*)	OECD (2016b)
gdp_growth (L1)	Annual GDP growth (of recipient countries)	percentage (%)	World Bank (2016a)
oilexp_cntry	Dummy variable for oil-exporting countries	equal to 1 if a recipient is an oil-exporting country, according to UNCTAD classification of coun-	UNCTAD (2016)
asia	Dummy variable for Asian countries	equal to 1 if a recipient is an Asian country (excl. MENA and Transcaucasian countries)	World Bank (2016b)
comecon	Dummy variable for non-socialist countries	equal to 1 if a recipient was a member, associate member, observer or cooperated with COME-	Zwass (1989)

Notes: *The term 'L1' means that the variable used in regressions was lagged by one period (year) which holds true for all time-variant variables. The term 'ln' means that the variable entered regressions in a form of natural logarithm.*

[*] *In Comtrade database (United Nations, 2016), trade data are provided in current prices (in USD). Therefore, we use the US GDP deflator data with the base year of 2010 (World Bank, 2016a) to recalculate the trade data to constant USD prices of 2010.*

Choice of an appropriate model

There are two broad categories of econometric methods that have been used to deal with the factors of aid allocation. The distinction between these two categories rests upon the treatment of zero aid allocations. If zero allocations are ignored, OLS methods or panel data techniques such as pooled OLS, random effects or fixed effects estimations could be used (see for example Alesina and Dollar, 2000). These methods may be employed when there are no zero allocations or when ignoring the zero allocations does not lead to a significant bias in estimations. On the other hand, when there is a substantial proportion of zero allocations, methods should be used that take this truncated nature of the dependent variable into account.

Because approximately 10 per cent of our observations on the dependent variable are zeroes, we have decided to employ the first category of models. This is in line with previous research, as studies aimed exclusively at Japanese aid allocation (that is, those that did not work with any other donors) have only employed the methods that ignore zero aid allocations. This is because Japan has provided aid to most of the developing countries that have been eligible to receive aid (see Appendix 1 for more details on the methods).

We work with panel data and assume that the unobserved heterogeneity does exist, and this is also confirmed by the Breusch-Pagan Lagrangian Multiplier tests. This means that we are left with two panel data estimation techniques. The choice between them rests upon the Hausman or Mundlak tests results. Because we work with heteroscedasticity robust standard errors we have to use the Mundlak test. In all instances, the Mundlak test results clearly point to the fixed effects estimator.

However, using the fixed-effect estimator, it is impossible to estimate the effects of the time-invariant variables. Therefore, we have also employed pooled OLS with recipient countries‘ and years‘ fixed effects (that is, the least squares dummy variable approach) with standard errors clustered on recipients. Following the procedure of Lundsgaarde et al. (2010), we lag all time-varying explanatory variables by one year to account for the aid decision-making sequence. So our final model, which contains the factors of donors‘ interests and recipients‘ needs as well as factors of merit, can be written in the following way (t stands for time, i stands for a particular recipient, ε is the error term):

$$\ln\_aid_{(i,t)} = \alpha + \beta_1 \ln\_gdp\_pc_{(i,t-1)} + \beta_2 \ln\_gdp\_pc\_2_{(i,t-1)} + \beta_3 \ln\_u5mort_{(i,t-1)} + \beta_4 \ln\_popul_{(i,t-1)} + \beta_5 \ln\_export\_gdp\_cp_{(i,t-1)} + \beta_6 freedom_{(i,t-1)} + \beta_7 avg\_wgi_{(i,t-1)} + \beta_8 \ln\_us\_oda1_{(i,t-1)} + \beta_9 oilexp\_cntry_{(i)} + \beta_{10} asia_{(i)} + \beta_{11} comecon_{(i)} + countries' fixed effects + years' fixed effects + \varepsilon_{(i,t)}.$$ [1]

Results and discussion

Beside the model specified above, we ran a variety of panel data fixed effects regressions

and pooled OLS regressions (with recipient countries' and years' fixed effects and standard errors clustered around recipients) in which we used different explanatory variables and also alternated various indicators within particular groups of factors. The complete results of our four models (each performed by means of the two methods described above) are presented in Fig. 2.

Fig. 2 – Regression models and results

dependent variable: ln_aid								
Variables \ Models	**(1.1) FE**	**(1.2) POLS + FE**	**(2.1) FE**	**(2.2) POLS + FE**	**(3.1) FE**	**(3.2) POLS + FE**	**(4.1) FE**	**(4.2) POLS + FE**
L1.ln_gdp_pc	8.103*** (2.593)	7.257*** (2.729)	7.725*** (2.897)	7.003** (2.976)	8.318*** (2.902)	7.578** (2.971)	8.255*** (2.907)	7.478** (2.923)
L1.ln_gdp_pc_2	-0.490*** (0.140)	-0.435*** (0.147)	-0.478*** (0.155)	-0.427*** (0.159)	-0.515*** (0.158)	-0.462*** (0.162)	-0.511*** (0.159)	-0.455*** (0.163)
L1.ln_u5mort	0.263 (0.378)	-0.094 (0.447)	0.643 (0.438)	0.291 (0.479)	0.751* (0.444)	0.369 (0.472)	0.756* (0.449)	0.365 (0477)
L1.ln_popul	2.250** (0.954	3.007*** (1.109)	3.298*** (0.991)	4.122*** (1.108)	3.060*** (0.890)	3.989*** (1.053)	3.068*** (0.898)	4.013*** (1.063)
L1.ln_export_ gdp_cp	0.334*** (0.101)	0.338*** (0.109)	0.199*** (0.072)	0.186** (0.080)	0.194*** (0.067)	0.170*** (0.071)	0.193*** (0.067)	0.168** (0.072)
L1.freedom			-0.209** (0.089)	-0.219** (0.091)	-0.173** (0.078)	-0.189** (0.081)	-0.172** (0.077)	-0.189** (0.081)
L1.avg_wgi			0.694** (0.303)	0.628** (0.309)	0.780** (0.299)	0.696** (0.304)	0.781** (0.300)	0.693** (0.305)
L1.ln_us_oda1					0.059** (0.026)	0.066** (0.028)	0.059** (0.026)	0.066** (0.028)
L1.gdp_growth							0.002 (0.005)	0.003 (0.004)
oilexp_cntry		-1.553*** (0.449)		-1.814*** (0.528)		-1.694*** (0.511)		-1.713*** (0.518)
asia		0.744 (0.919)		0.291 (0.854)		0.247 (0.819)		0.171 (0.835)
comecon		-5.677*** (2.151)		-6.890*** (2.012)		-6.627*** (1.840)		-6.637*** (1.853)
Constant	-62.404*** (16.795)	-66.148*** (17.457)	-78.154*** (19.573)	-83.198*** (20.212)	-77.479*** (18.991)	-84.426*** (19.693)	-77.413*** (19.040)	-84.434 (19.794)
B-P LM test	2842.3***		2366.3***		2342.4***		2330.5***	
Mundlak test	13.15**		27.75***		33.40***		33.74***	
Within R^2	0.1022		0.1243		0.1473		0.1473	
Between R^2	0.5153		0.5234		0.5318		0.5311	
Overall R^2	0.3891	0.7521	0.3957	0.7698	0.4035	0.7771	0.4028	0.7770
F test	8.69***	n/a	7.75***	n/a	6.50***	n/a	5.81***	n/a
Rho	0.9403		0.9719		0.9692		0.9693	
Observations	2621	2621	2373	2373	2373	2373	2369	2369
No. of groups	146		141		141		141	

Note: *Standard errors of the estimates are in parentheses. The level of significance: *** 1%; ** 5%; * 10%. The term 'ln' means that the variable entered regressions in logarithmic form. The term 'L1' means that the variable used in regressions was lagged by one year. The pooled OLS models were estimated with standard errors clustered on recipient countries. Recipient countries' and years' fixed effects are not presented. The FE models were estimated with robust standard errors.*

In the first two models, only the factors measuring recipients' needs and donors' interests were included. In the second set of models, we add institutional variables as a control for factors of merit. The third pair of models contains an additional extra variable as a control for the Gaiatsu factor in Japanese aid allocation. The last couple of models incorporate the GDP growth variable to account for economic merit (that is, whether Japan rewards the good economic dynamics of recipients in its allocation). The sets of variables that are employed in the analyses are the same for both regression methods. However, using the pooled OLS approach (in contrast to the FE approach) we are able to include the time-invariant variables (all of them are, by chance, dummy variables).

The regression results show strong stability throughout the models. The natural log of GDP per capita is always positive and significant (at least a 5 per cent significance level) as well as its square, which is always negative and highly significant. In the presence of these two factors, the natural log of under-five mortality is mostly positive but insignificant, except for the last two FE models in which it is marginally significant. The natural log of population is always positive and highly significant as well as the log of share of Japanese exports to recipient countries on Japanese GDP. Both institutional variables are always significant at 5 per cent level, each with the expected sign. The volume of US aid is positive and significant at 5 per cent, whereas GDP growth is highly insignificant in both models entered. Similarly, the time-invariant dummy variables yield the same results in each model: membership of the former COMECON is negative and significant and so is belonging to the group of oil exporting countries. On the other hand, the variable indicating whether a country is an Asian country is positive but insignificant.

So what do the results tell us? First, they show that Japanese aid allocation somehow reflects the recipients' needs, since both variables related to economic needs; the natural log of GDP per capita and its square, are always significant. However, they also indicate that there is a clear middle income effect in Japanese aid allocation. When the natural log of recipients' GDP per capita increases, the natural log of Japanese aid first increases and then decreases. This means that there is an inverse U-shape in the relationship between income and Japanese allocation of aid. In other words, Japan has a tendency to support middle income countries by providing them with more aid (the turning points differ slightly among the different models, their values fluctuate around 3900 USD in PPP). This outcome corroborates the findings of Cooray et al. (2005) who detected similar income effects in Japanese aid allocation.

The results also imply that the social needs of recipient countries do not play a role in Japanese aid allocation because the natural log of under-five mortality is almost always insignificant. However, it has to be borne in mind that in all regressions we use a control for (ln of) GDP per capita (and its square), and there is a high correlation between ln of GDP per capita and ln of under-five mortality (the correlation coefficient is -0.7918). Therefore we may suspect that these two factors are highly collinear, which actually may be the case. Once we exclude the economic variables from the model, under-five mortality is highly significant and positive (aid has a tendency to flow to recipient countries with higher child mortality). Interestingly, if we replace (ln of) under-five mortality rate by (ln of) life expectancy at birth (World Bank, 2016a), the new variable is always insignificant (although negative), regardless of whether the economic variables are kept in the models or not (these regressions are not reported in the table above). This suggests that it actually matters which variable is used to measure the social needs of the recipient countries. The population size of recipient countries may also be classified as a variable of recipients‘ needs because larger populations, ceteris paribus, need higher absolute amounts of aid. The results clearly confirm such expectations: the coefficient of the natural log of recipients‘ populations is positive and highly significant.

Second, the results show that factors relating to Japan’s interests are also taken into consideration in relation to Japanese aid allocation. The export variable is positive and always significant at 1% level in all FE models and at least at 5% in POLS models. This confirms the theoretical findings that Japanese export is a significant determinant of Japanese aid allocation. The results are unchanged when trade is used instead of export. In contrast, while we hypothesised that Japan fosters its interests by giving more aid to countries that are oil exporters, our POLS regressions show in all instances (at 1 per cent level of significance) that Japan actually gives more aid to countries that are not classified as oil exporting countries. Our POLS regressions also show that Japan gives more aid to former non-socialist countries (approximated by their relation to COMECON). This reflects the fact that the historical and political orientation of Japan still plays a role in the current (at least up until quite recently) Japanese aid allocation. On the other hand, geographical factors contradict our expectations and a theory: it seems that after using a control for all other factors (see Fig.2), there is no statistically significant Asian effect in Japanese aid allocation (the asia variable is always positive, yet insignificant). This conclusion holds even when the asia variable is replaced by geographical distance (Mayer a Zignago, 2011), which is also insignificant.

Additionally, we employ one Gaiatsu factor that also reflects to some extent Japan’s (political) interests: the amount of US official development aid provided on a bilateral basis to recipient countries. The results show that the volumes of US ODA are a positive and statistically significant (at 5 per cent level) determinant of Japanese aid allocation. In other words, the higher the US ODA to recipient countries, the higher the Japanese aid allocation. Overall, it is possible to conclude that the factors relating to donors' interests are sig-

nificant in Japanese aid allocation, however not as convincingly as suggested by some previously published papers.

Third, the results show that factors of merit are significant in Japanese aid allocation and that Japan tends to reward countries with better institutional qualities and countries that are freer and more democratic. The freedom variable (the Freedom in the World index) is negative and significant (at 5 per cent) in all specifications it is entered into, which means that higher levels of aid allocation are associated with a lower value of this variable (that is, with a higher level of political and civil freedom). Similarly, the institutional quality variable (avg_wgi, the average over six dimensions of the Worldwide Governance Indicators) is always significant (at 5 per cent) and positive which indicates that higher aid allocation is associated with better institutional quality. On the other hand, it seems that Japan does not reward countries that grow faster with higher amounts of aid: although the variable measuring GDP growth is positive (that is, higher aid allocation is associated with higher GDP growth), it is clearly insignificant.

Finally, in our analysis we focused on the most recent decade in our dataset (2004–2014) since this period has not been investigated in any of the studies discussed in section 2. We performed the same regression analyses and found that most of our results hold true, although the significance of almost all variables drops. A few of them actually become slightly insignificant in some of the models: the WGI variable, the US aid variable and the oil-exporters dummy. The only variable for which the drop of significance is more dramatic is the export variable, and it is now clearly insignificant (p-value well below one in almost all models). While it is tempting to interpret this in such a way that means export interests have not played a role in Japanese aid allocation in the most recent period, it must be borne in mind that lower p-values of almost all variables may be a consequence of a lower number of observations. To examine this, we extended the period to 2000–2014 and then repeated the analysis. We find almost the same results as for the entire period, with one exception: in most of the models (except the first one), the export variable remains insignificant. Therefore the significance of the export variable may have been decreasing in the recent period.

Conclusions

In this paper we analysed the factors that have affected the territorial allocation of Japanese aid over the last two decades. Although there are more than ten empirical studies concerning factors relating to Japanese aid allocation, there is no clear consensus on the role of some of the factors. The additional value of our study is that it provides (a) a review of (to our knowledge) all available studies, in terms of the methods and results and (b) a set of regression analyses over a recent and relatively long period (1994–2014).

We have used regression analysis to review 12 studies into the factors affecting Japanese aid allocation. The methodologies of the studies differ in many aspects, such as the time period, the set of recipients, donors and determinants, and in the methods employed.

While the studies are not directly comparable, it may also be argued that the conclusions that survive such divergent conditions are, in effect, robust.

Generally speaking, most of the studies have found all major groups of factors (that is, some of their variables) to be significant determinants of Japanese aid allocation. However, substantial differences have been identified in the primacy of the factors. Most studies found Japan to be a rather selfish donor whose aid allocation is driven by its own interests. Factors of political and/or economic interests were either key or non-negligible drivers in aid allocation in 10 out of the 11 studies that examined these factors (one study did not); the factor most often confirmed was export/trade. Only one of these studies has found no support for economic interests (Tuman et al., 2009). However, some studies stress the importance of factors relating to the recipients‘ needs in Japanese aid allocation. These studies only focus on Japan and this conclusion tends to be more true in the most recent period under study. The studies that employed a Gaiatsu hypothesis (the importance of US security and economic interests as a specific factor in Japanese aid allocation) have found some support for this view.

The empirical part of the paper aimed to identify significant determinants in the territorial allocation of Japanese ODA in 156 developing countries over the period 1994–2014. As a relatively small share of observations on the dependent variable are zero allocations, we performed a variety of panel data fixed effects regressions and pooled OLS regressions (with recipient countries‘ and years‘ fixed effects and standard errors clustered around recipients) in which we used different explanatory variables and also alternated various indicators within particular groups of factors. The regression results show strong stability throughout the models, indicating the robustness of the conclusions.

Our results confirm the significance of some variables from each of the three groups of factors. Overall, they are in line with the “average” results of previous studies but deviate in some aspects. We confirmed that there is a role for Japan’s interests in its aid allocation, but that is relatively lower than found in previous studies. We examined two variables of economic interests: our analysis confirms the significance of export/trade, as found in most of the previous studies, but we have not found support for the “oil hypothesis” (actually the opposite was found – Japan gives more aid to countries that are not classified as oil exporting countries). While the export/trade variable may be a more direct proxy for economic interests and interdependence, we also note that its significance has diminished in the more recent period. Contrary to other studies, we have found little support for Asian bias in aid allocation, nor for geographic distance. Japan therefore does not seem to use aid in order to strengthen its position in the region. The preference for non-socialist countries is a reflection of historical Cold War divisions rather than being driven by current political interests. On the other hand, our results show that Japan tends to give (more) aid to countries that are recipients of US aid. This supports the Gaiatsu hypothesis, but it also reflects Japanese political interests.

In line with most studies we found only moderate support for recipient countries' needs. Our results show that the level of economic development influences Japanese aid allocation, but in a non-linear fashion. There is an inverse U-shaped relationship between income and aid – below a certain threshold Japan prefers richer rather than poorer countries, but this pattern is reversed above the threshold. This corroborates the findings of Cooray et al. (2005). The interpretation as to whether this reflects the "needs hypothesis" is not clear. Japan tends to support neither the poorest nor the richest developing countries. While the threshold found in the models (cca 3,900 PPP USD) is not very high, it is not so low that we could ignore the fact that below the threshold Japanese aid allocation is anti-poverty oriented. The level of social development is not a significant factor once we use a control for the level of economic development (GDP per capita). The last variable reflecting recipients' needs – population size – is always a positive and highly significant factor as expected.

The factors measuring governance, democracy and freedom are all significant determinants – Japan tends to reward countries that have better governance and higher levels of freedom and democracy. If these institutional factors increase the effectiveness of aid, Japanese aid allocation can be viewed positively. On the other hand, the dynamic of economic growth is not a significant factor – Japan does not reward countries that grow faster with more aid.

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Appendix 1 – Summary of studies and methods used to analyse the factors of Japanese aid allocation

Study	Donor; Recipients; Period; Dependent Varia-	Method	Conclusion with regard to factors of Japanese aid alloca-
Katada (1997)	Japan 19 recipients in Latin America and the Caribbean 1975–1991 net total aid disbursement	weighted least squares (WLS)	political interests as the main determinant; economic interests important to a lesser extent; support to *Gaiatsu* hypothesis (to both US economic and security interests); support also for the recipients' needs hypothesis
Schraeder et al. (1998)	4 donors including Japan 36 recipients in Africa 1980–1989 total aid disbursement as % of the recipient	generalised least squares, error components (GLSE)	economic self-interest as the key determinant; lower support also for the recipients' needs hypothesis
Alesina, Dollar (2000)	21 donors including Japan 180 recipients 1970–1994 five-year averages of total amount of aid dis-	pooled OLS random-effects tobit model two-stage least squares (2SLS)	political interests as the main determinant (former colonies, UN votes); low support for the recipients' needs hypothesis (one of the lowest elasticity to recipients' incomes);
Berthélemy & Tichit (2004)	22 donors including Japan 137 recipients 1980–1999	random-effects tobit model	economic interests as the most important single determinant (trade and investments)
Tuman & Ayoub (2004)	Japan 35 recipients in Africa 1979–1998 net total aid disbursement	pooled OLS with panel-corrected standard errors	recipients' needs as the main determinants (poverty, food insecurity); aid rewarding a greater respect for human rights; only partial support to economic interests' hypothesis; partial support to *Gaiatsu* hypothesis (to US security interests)
Cooray et al. (2005)	Japan 96 recipients 1981–2001 total aid commitment	pooled OLS fixed-effects model	both national interests and recipients' needs hypotheses supported; income, population and Asian bias in Japanese aid allocation
Canavire et al. (2005)	9 donors including Japan full sample of recipients and IDA eligible countries 1999, 2000, 2001, 2002 (*cross-sectional data*)	tobit model (cross-sectional)	Japanese aid driven by selfish, export-related motivations, and is weakly poverty and policy oriented.

Berthélemy (2006)	22 donors including Japan 137 recipients 1980–1999 total amount of aid commitment per capita	heckman model two-part model (probit + linear)	Japan as a "moderately egoistic" donor (national interests' hypothesis relevant); Japan as an "egoistic" donor when Asian dummy dropped (very large support for the national interests' hypothesis)
Angeles et al. (2008)	7 donors including Japan 104 recipient countries 1984–2003 (special focus on post-1998 period) total gross ODA	fixed-effects model pooled OLS tobit random-effects model	national interests' hypothesis as the key determinant over 1984–2003; recipients' needs hypothesis much more relevant after 1998 than before;
Younas (2008)	22 donors including Japan 78 net aid recipients 1991–2003 real (net) aid per capita from a specific donor	pooled OLS	recipients' imports of Japanese machinery and transportation equipment as the key determinant; population bias in Japanese aid allocation (small countries get more aid);
Tuman et al. (2009)	Japan 86 recipients 1979–2002 real net Japanese aid to recipients' real GDP (%)	pooled OLS with fixed-effects dummy variables (LSDV) and panel-corrected standard errors	recipients' needs hypothesis as the main determinant; *Gaiatsu* hypothesis only partially supported; no support to economic interests hypothesis (Japanese economic interests had opposite effects than expected);
Harrigan & Wang (2011)	7 donors including Japan 153 recipient countries 1966–2008 aid commitment of a donor divided by a recipient's population (%)	pooled OLS with fixed-effects dummy variable (LSDV) probit random-effects model tobit random-effects model	recipients' needs hypothesis not supported in pooled OLS framework; recipients' needs hypothesis strongly supported in the tobit model framework; large Asian bias

Source: Created by authors, based on studies cited in the first column.

Notes

[1] These are the two step procedures (probit or logit estimations in the first step combined with OLS or panel data estimations on non-zero allocations in the second step, see for example Barthel er al., 2013 or Berthélemy, 2006), heckman methods (for example Lundsgaarde et al., 2010 or Berthélemy, 2006) or tobit regressions (for example Dreher et al., 2009; Canavire et al., 2005 or Opršal et al., 2017).

[2] It could be nevertheless stressed, that such an approximation by a dummy variable may be too crude: a more precise measurement (such as for example a share of oil exports on total exports or on GDP of a particular country) could modify such conclusion.

[3] Asia dummy is the only variable whose significance actually increases. In the first model it is significant at 10% level while in the rest of the models it is narrowly insignificant.