**Partisan Politics, Subsidy Transfers, and Social Policies under Decentralization:**

**A Cross-Regional Time-series Data Analysis for South Korea**

**Online Appendix**

1. **Annual Trend of Government Spending on Social Policies under Decentralization**

Figure A. GDP Share of General Government Expenditure

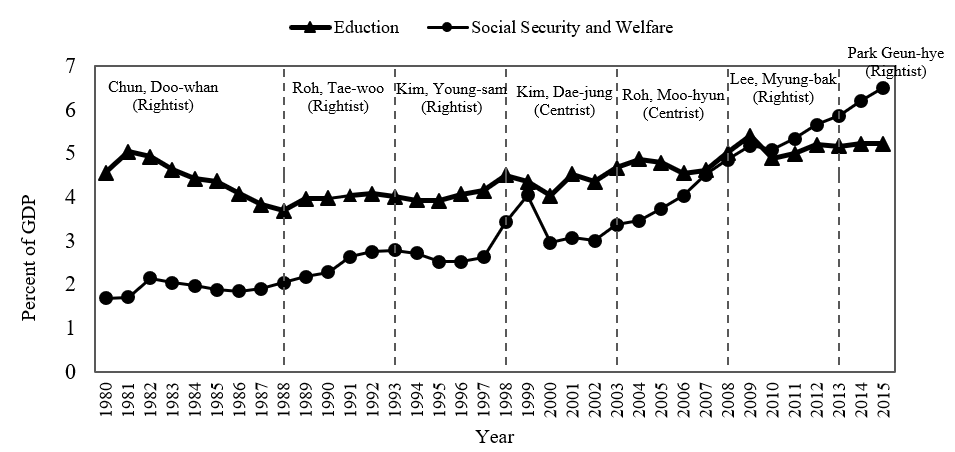
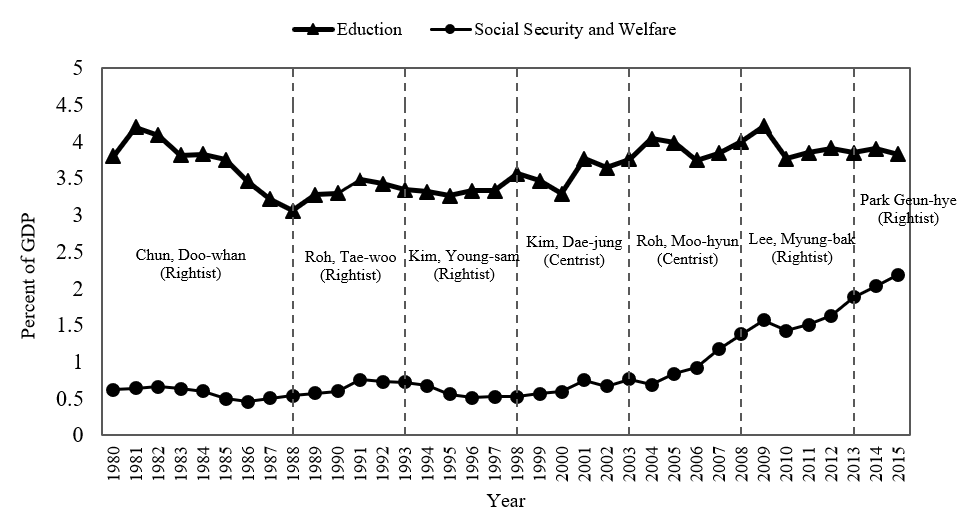


Figure B. GDP Share of Local Government Expenditure



Sources: National Accounts & Government Expenditure by Function (COFOG), OECD Statistics

1. **Major Parties and Partisanship Information**

Table A. List of Political Parties in Korea and the President’s Partisan Affiliation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Party Abbreviation | Party Name (English) | Party Name (Romanized) | Ideological Position | President Name (Last, first) | Office Terms |
|  |  |  |  |  |  |
| DJP | Democratic Justice Party | Minju Jeongui-dang | Rightist | Chun, Doo-Hwan | 1981-1988 |
|  |  |  |  | Roh, Tae-Woo | 1988-1993 |
| DLP | Democratic Liberal Party | Minju Jayu-dang | Rightist | Kim, Young-Sam | 1993-1998 |
|  |  |  |  |  |  |
| NFP | New Frontier Party | Saenuri-dang | Rightist | Park, Geun-Hye | 2013-2017 |
|  | (Liberty Korea Party) | (Jayu Hankook-dang) |  |  |  |
|  |  |  |  |  |  |
| GNP | Grand National Party | Hanara-dang | Rightist | Lee, Myuong-Bak | 2008-2013 |
|  |  |  |  |  |  |
| ULD | United Liberal Democrats | Jayu Minju-yeonhap | Rightist |  |  |
|  |  |  |  |  |  |
| LFP | Liberal Forward Party | Jayu Seonjin-dang | Rightist |  |  |
|  |  |  |  |  |  |
| AUP | Advanced Unification Party | Seonjin Tongil-dang | Rightist |  |  |
|  |  |  |  |  |  |
| NPAD | New Politics Alliance for Democracy | Saejeongchi Minju-yeonhap | Centrist |  |  |
|  | (Together with Democratic Party) | (Deobooleoh Minju-dang) |  |  |  |
|  |  |  |  |  |  |
| DP | Democratic Party | Minju-dang | Centrist |  |  |
|  |  |  |  |  |  |
| OOP | Opened Our Party | Yeollin Uri-dang | Centrist | Roh, Moo-Hyun | 2004-2008 |
|  |  |  |  |  |  |
| NCNP | National Congress for New Politics | Saejeongchi Kookmin-heoui | Centrist | Kim, Dae-Jung | 1998-2003 |
|  |  |  |  |  |  |
| MDP | Millennium Democracy Party | Saecheonnyeon Minju-dang | Centrist | Roh, Moo-Hyun | 2003-2004 |
|  |  |  |  |  |  |

*Note*: The DLP was formed in 1990 by merging the rightist politicians from the coalition between the Republican Democratic Party (RDP) and the New Democratic-Republican Party (NDP) along with the DJP. The DLP changed its name to GNP in 2008, which changed to the NFP in 2012. The NCNP changed its name to the MDP in 2000, which was divided into the OOP (the governing party for President Roh Moo Hyung) and the DP. After losing the 2007 presidential election, the OOP and DP were merged to the United Democratic Parties (UDP) in 2008, which was changed to the NPAD in 2014. Found in 1995, the ULD was a regionalist party based on the Midwest of Korea (City of Daejeon and North/South Chungcheong provinces). The ULD changed its name to the AUP and then it was merged to the NFP in 2012.

Table B. List of Regional Chief Executives’ Partisan Affiliation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Region | Local Executives | Years | Party | Ideology |
| Seoul Special City | 고건  이명박  오세훈  박원순 | 1998-2002  2002-2006  2006-2011  2011-2022\* | NCNP / MDP  GNP  GNP  DP / NPAD | Centrist  Rightist  Rightist  Centrist |
| Busan | 안상영  허남식  서병수 | 1998-2004  2004-2014  2014-2018 | GNP  GNP / NFP  NFP | Rightist  Rightist  Rightist |
| Daegu | 문희갑  조혜녕  김범일  권영진 | 1995-2002  2002-2006  2006-2014  2014-2022\* | GNP  GNP  GNP / NFP  NFP | Rightist  Rightist  Rightist  Rightist |
| Incheon | 최기선  안상수  송영길  유정복 | 1995-2002  2002-2010  2010-2014  2014-2018 | DLP / GNP / ULD  GNP  DP / NPAD  NFP | Rightist  Rightist  Centrist  Rightist |
| Gwangju | 고재유  박광태  강운태  윤장현 | 1998-2002  2002-2006  2010-2014  2014-2018 | NCNP / MDP  MDP / DP  DP / NPAD  NPAD | Centrist  Centrist  Centrist  Centrist |
| Daejeon | 홍선기  염홍철  박성효  염홍철  권선택 | 1995-2002  2002-2006  2006-2010  2010-2014  2014-2017 | ULD  GNP / OOP  GNP  LFP / AUP / NFP  NPAD | Rightist  Rightist / Centrist  Rightist  Rightist  Centrist |
| Ulsan | 심완구  박명우  김기현 | 1995-2002  2002-2014  2014-2018 | DLP / GNP / NCNP / NDP  GNP / NFP  NFP | Rightist / Centrist  Rightist  Rightist |
| Gyeonggi | 임창렬  손학규  김문수  남경필 | 1998-2002  2002-2006  2006-2014  2014-2018 | MDP  GNP / NFP  GNP / NFP  NFP | Centrist  Rightist  Rightist  Rightist |
| Gangwon | 김진선  이광재  최문순 | 1998-2010  2010-2011  2011-2022\* | GNP  DP  DP / NPAD | Rightist  Centrist  Centrist |
| North Chungcheong | 이원종  정우택  이시종 | 1998-2006  2006-2010  2010-2022\* | ULD / GNP  GNP  DP / NPAD | Rightist  Rightist  Centrist |
| South Chungcheong | 심대평  이완구  안희정 | 1995-2006  2006-2009  2010-2018 | ULD  GNP  DP / NPAD | Rightist  Rightist  Centrist |
| North Jeolla | 유종근  강현욱  김완주  송하진 | 1995-2002  2002-2006  2006-2014  2014-2022\* | DP / NCNP / MDP  MDP / OOP  OOP / DP  NPAD | Centrist  Centrist  Centrist  Centrist |

*Note*: The local executive list by year is based on our data analysis ranging from 2002 to 2015.

\* denotes the scheduled local election year for the incumbent governors or mayors.

Table B. Continued.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Region | Local Executives | Years | Party | Ideology |
| South Jeolla | 허경만  박태영  박준영  이낙연 | 1995-2002  2002-2004  2004-2014  2014-2017 | DP / NCNP / MDP  MDP  MDP / DP / NPAD  NPAD | Centrist  Centrist  Centrist  Centrist |
| North Gyeongsang | 이의근  김관용 | 1995-2006  2006-2018 | DLP / GNP  GNP / NFP | Rightist  Rightist |
| South Gyeongsang | 김혁규  김태호  김두관  홍준표 | 1995-2003  2004-2010  2010-2012  2012-2017 | DLP / GNP  GNP  IND / DP  NFP | Rightist  Rightist  Centrist  Rightist |

*Note*: IND (Independent). The local executive list by year is based on our data analysis ranging from 2002 to 2015.

1. **Data for Analyses**

Table C. Data Descriptions, Summary Statistics, and Sources

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** | **Descriptions** | **Min** | **Max** | **Mean** | **Sources** |
|  |  |  |  |  |  |
| *Inter-government Subsidies* |  |  |  |  |  |
| SUBSIDYPC | Sum of the NTS and the LST. Measured in per capita unit: 1 million ₩. Data available from 2002  NTS: Subsidies from the national treasury are distributed to support local government expenditure in predefined policy categories. The NTS seeks to promote conditions for public services provided by local governments as well as improve overall policy efficiency. Thus, Measured in per capita unit: 1 million ₩. Data are available from 2002.  LST: Subsidies as local shared tax are a grant by the central government to local authorities. The size of the LST is proportional to the difference between the financial need amount and the fiscal resource amount of each local authority. For the use of the LST at the local level, the central government does not impose any restrictions on policy implementation, thus creating more room for the discretionary spending by local authorities. Measured in per capita unit: 1 million ₩. Data available from 2002 | 0.067 | 2.684 | 0.921 | Local Finance Integrated Open System:  <http://lofin.mois.go.kr> |
|  |  |  |  |  |  |
| *Local Government Spending* |  |  |  |  |  |
| SSWPC | Social security and welfare spending by local governments. Spending accounts for policy areas including basic livelihood support, marginal class support, childcare, family & women & senior citizens, juveniles, labor, patriot & veteran affairs, housing, and general affairs. Measured in per capita unit, 1 million ₩. Data available from 2008 | 0.028 | 0.292 | 0.155 |  |
| EDUPC | Public education spending by local governments. Spending accounts for policy areas, including the free school lunch program, about 4.4.% of the total annual expenditure settlement, and support for the preschool program. Measured in per capita unit: 1 million ₩. Data available from 2004. | 0.498 | 1.925 | 0.981 | Ministry of Education: <http://www.eduinfo.go.kr>,  Korea Institute of Public Finance:  <http://www.kipf.re.kr> |

*Continued*

Table C. Continued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** | **Descriptions** | **Min** | **Max** | **Mean** | **Sources** |
|  |  |  |  |  |  |
| *Political Ideology* |  |  |  |  |  |
| ALIGNMENT | Partisan alignment: 1 = the president and regional chief executive are from the same party; 0 = otherwise.  (if the mid-year regular election or by-election year took place, take the partisan affiliation of the exiting incumbent) | 0 | 1 | 0.352 | National Election Committee  <http://nec.go.kr> |
| CENTRIST | Is the regional chief executive's partisan ideology centrist? Yes = 1 (Centrist), No= 0 (Rightist or Independent)  (if the mid-year regular election or by-election year took place, take the partisan affiliation of the exiting incumbent) | 0 | 1 | 0.324 |
|  |  |  |  |  |
| *Electoral Outcomes* |  |  |  |  |
| PRESVOTE | Share of previous vote cast (in ratio) for the president by region | 0.021 | 0.983 | 0.455 |
| LOCALVOTE | Share of previous vote cast (in ratio) for the regional chief executive by region (if the mid-year regular election or by-election year took place, take the vote share of the exiting incumbent). 1 = single candidate. | 0.364 | 1 | 0.617 |
| PRESCOMP | Absolute value on the difference between share of previous vote cast (in the ratio) for the president by region and previous vote cast for the second most vote-getter (by region). | 0.013 | 0.956 | 0.380 |
| LOCALCOMP | Absolute value on the difference between the share of previous vote cast (in ratio) for the regional chief executive by region and previous vote cast for the second most vote-getter. 0 = single candidate. | 0 | 1 | 0.317 |
|  |  |  |  |  |  |
| *Socio-economic Indicators* |  |  |  |  |  |
| REVENUEPC | Regional government revenue measured in per capita unit: 1 million ₩. Subsidies are excluded. | 0.423 | 2.223 | 1.056 | Local Finance Integrated Open System:  <http://lofin.mois.go.kr> |
|  |  |  |  |  |  |

*Continued.*

Table C. Continued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** | **Descriptions** | **Min** | **Max** | **Mean** | **Sources** |
|  |  |  |  |  |  |
| *Socio-economic Indicators* |  |  |  |  |  |
| RGDPPC | Regional Gross Domestic Products measured in per capita unit: 1 million ₩. | 10.338 | 63.402 | 23.534 | Korean Statistical Information System (KOSIS) Statistical Database:  <http://kosis.kr> |
| LOGFAMHOUSE | Log of the number of farm household by region (thousand) | 0.584 | 5.386 | 3.624 |
| LOGPOP | Log of the regional population (million), all ages. | 0.055 | 2.508 | 0.905 | OECD Regional Statistics:  <https://stats.oecd.org> |
| UNEMP | Unemployment rate (% of the unemployed over labor force 15-64) | 1.400 | 5.300 | 3.335 |
| DEPENDENCY | Demographic distribution (% of age under 15 or above 65) | 0.303 | 0.574 | 0.408 |
|  |  |  |  |  |  |

*Notes:*

Periods: 2002-2015 (Subsidies: NTS, LST); 2004-2015 (Education Spending); 2008-2015 (Social Welfare, Health Spending)

15 Regions (not including Jeju Special Autonomous, Sejong Self-governing city).

We code the partisan affiliations and ideology of presidents, mayors and governors based on the dates of their inaugurations. Presidential elections were held every five years (2002, 2007, and 2012) in December and the new terms began in the February of the following year. Local elections were held every four years

1998, 2002, 2006, 2010, and 2014) in June and the new terms began in the July of that elected year.

Source: National Health Insurance Service (http://www.nhis.or.kr). Health Insurance Review and Assessment Services (http://www.hira.or.kr).

Table D. Changes in Subsidies and Social Policy Spending

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Per capita Social Expenditures (in thousand won) | | | | | | |  | Per Capita Subsidies (in thousand won):  NTS + LST  (2002-2015) | | |
|  | Social Security and Welfare Spending  (2008-2015) | | |  | Education Spending  (2004-2015) | | |  |
| List of 15 Local Governments\* | First 4 Years Averaged  2008-11 | Last 4 Years  Averaged  2012-15 | Change (Rank) |  | First 4 Years Averaged  2004-7 | Last 4 Years Averaged  2012-15 | Change  (Rank) |  | First 4 Years Averaged  2002-5 | Last 4 Years  Averaged  2012-15 | Change  (Rank) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Busan Metropolitan City | 151 | 213 | 62 (3) |  | 634 | 975 | 341 (12) |  | 246 | 1,037 | 791 (4) |
| Daegu Metropolitan City | 135 | 187 | 52 (5) |  | 604 | 1,031 | 427 (9) |  | 300 | 1,052 | 752 (6) |
| Daejeon Metropolitan City | 120 | 179 | 59 (4) |  | 693 | 1,057 | 364 (11) |  | 327 | 902 | 575 (10) |
| Gangwon Province | 141 | 166 | 25 (10) |  | 945 | 1,551 | 606 (2) |  | 1,286 | 1,893 | 607 (9) |
| Gwangju Metropolitan City | 139 | 188 | 49 (6) |  | 680 | 1,129 | 449 (7) |  | 418 | 1,130 | 712 (8) |
| Gyeonggi Province | 59 | 71 | 12(13) |  | 620 | 944 | 324 (13) |  | 153 | 461 | 308 (14) |
| Incheon Metropolitan City | 61 | 146 | 85 (1) |  | 687 | 968 | 281 (14) |  | 192 | 715 | 523 (11) |
| North Chungcheong Province | 127 | 152 | 25 (10) |  | 807 | 1,350 | 543 (4) |  | 688 | 1,428 | 740 (7) |
| North Gyeongsang Province | 149 | 183 | 34 (7) |  | 817 | 1,323 | 506 (5) |  | 798 | 1,748 | 950 (3) |
| North Jeolla Province | 190 | 221 | 31 (8) |  | 914 | 1,479 | 565 (3) |  | 865 | 1,923 | 1,058 (2) |
| Seoul Special City | 204 | 274 | 70 (2) |  | 533 | 782 | 249 (15) |  | 80 | 298 | 218 (15) |
| South Chungcheong Province | 125 | 127 | 2 (15) |  | 908 | 1,319 | 411 (10) |  | 664 | 1,424 | 760 (5) |
| South Gyeongsang Province | 122 | 146 | 24 (12) |  | 778 | 1,224 | 446 (8) |  | 757 | 1,132 | 375 (12) |
| South Jeolla Province | 218 | 228 | 10 (14) |  | 1,035 | 1,772 | 737 (1) |  | 1,212 | 2,520 | 1,308 (1) |
| Ulsan Metropolitan City | 97 | 123 | 26 (9) |  | 730 | 1,199 | 469 (6) |  | 256 | 615 | 359 (13) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Grand Average | 136 | 174 | 38 |  | 759 | 1,207 | 448 |  | 549 | 1,219 | 669 |
|  |  |  |  |  |  |  |  |  |  |  |  |

*Notes*:

Two periods as an even split of the sample duration.

Period average values are based on per capita unit of Korean thousand won (₩), which is equivalent to $0.8473 for December 31, 2015.

\*Jeju self-governing province and Sejong special self-government city are omitted from analysis. Public data on Sejong Special Self-Governing City is available after 2012.

Since its democratic transition in 1987, Korea has significantly decentralized its political and financial system to promote grassroots (participatory) democracy and equivalent economic development across regions. According to Article 1 of the Local Autonomy Act, for example, the main purpose of local self-governance is to achieve the balanced and democratic development of the nation through the democratic and efficient administration of local governments. Similarly, local councils were first elected in 1991, and the heads of local governments at both municipal and regional levels were elected in 1995. The Kim Dae-jung government (1998-2003) revised the Local Autonomy Act to further expand the autonomy of local governments over administration and budget. The Roh Moo-hyun government (2003-2008) revised the Local Subsidy Act to increase local subsidy taxes from 15 to 19.24 percent of national taxes and transferred the majority of social services to local governments. The Lee Myung-bak government (2008-2003) passed the Special Act on the Promotion of Decentralization in 2008 to improve the transparency and reliability of finance in local governments.

For example, according to National Assembly Budget Office (2020), the subsidy transfers consist of a large national budget and have significantly increased over time. Based on the 2019 budget, 36.3 percent of the national budget was transferred to local governments. In fact, the central government transferred ₩59.1 trillion for LES (Local Education Subsidies or 지방교육재정교부금), ₩58.8 trillion for NTS (National Treasury Subsidies or 국고보조금), and ₩52.5 trillion for LST (Local Shared Tax or 지방교부세) to local governments (12.5, 11.8, 10.5 percent of the total central government expenditures, respectively). Especially, for NTS and LST jointly in 2019, they add up to about 47.2 percent of the average revenue of local governments. The combined amount of the three subsidies (transferred resources) encompasses a significant portion of national-level expenditures, accounting for roughly 23 percent of the central government’s total spending.

As shown in Table D, subsidy transfers to regional governments in Korea generally increased over time, but also significantly varied across regions, even after controlling for the size of the regional population. We excluded healthcare spending from our analysis because Korea’s National Health Insurance Service has provided universal healthcare coverage to the entire population since 1989. See Section 7 below for details. In general, the sparsely populated provinces, such as South/North Jeolla, South/North Chungcheong, and Gangwon, have higher levels of subsidies per capita as compared to the densely populated big cities, such as Incheon and Daejeon. Still, there are significant variances across regions and time. For example, Pusan and Daegu, two metropolitan cities, also experienced significant increases in subsidy transfers over time.

1. **Empirical Method: Arellano-Bond Difference GMM Estimator**

The Arellano-Bond GMM by first differencing excludes time-invariant factors such as geography from the proposed model equations (eq.1 and eq.2 as shown in the main text). These fixed effects models, by nature, control for regional-specific characteristics such as regionalism in Korea. Still, if regional-specific characteristics are correlated with the explanatory variables in the models, the error term in the model ( can include the unobserved region-specific effects as well as unobserved error ().

The unobserved region-specific effects in the error term typically diminish as the number of time (T) in the dataset becomes significantly larger than the number of panels (N) (T>N). Yet, when T is smaller than N (T<N), the region-specific effects can generate significant errors in the estimation (Nickell 1981; Kiviet 1995; Roodman 2006). In this case, Arellano and Bond (1991) recommend the Arellano-Bond *difference* GMM, which remove the unobserved region-specific effects by transforming the regressors to first differences.

Because our cross-sectional data have a shorter number of time (T:2002/2008-2015) than the number of panels (N:15 regions) (T<N), we use the Arellano-Bond *difference* GMM in this paper. The transformed equations in the models are the following:

(eq.1 transformed)

+ (eq.2 transformed)

As shown, the unobserved region-specific effects are removed in the Arellano-Bond difference GMM models by differencing the error term: =() + ) = .

Additionally, we resolve potential endogeneity issues by using the second period lag of the dependent variable— and —as an instrumental variable (Arellano and Bond 1991). This GMM instrument helps us avoid the potential reverse causality (e.g., the impact of subsidies on voting patterns in presidential elections) and any possible autocorrelations between the first-differenced lagged dependent variable and error term (). Arellano and Bond (1991) suggest that the lagged dependent variable(s) is generally a better instrument than any exogenous instruments (which can risk introducing additional bias into the estimation). The coefficient of the lagged dependent variable should be positive and statistically significant, and its value should be less than 1 (e.g., 0 < *ϕ* < 1 in eq.1) to justify the instrument.

The empirical results in this paper confirm the conditions of the Arellano-Bond *difference* GMM models. In Tables 1-3, all of the lagged dependent variables (, , and ) have positive and statistically significant coefficients, and their values are less than 1. The results confirm that the second lags of the dependent variables are justified instruments for our dynamic GMM models (e.g., 0 < *ϕ* < 1). The results confirm that the second lag of the dependent variable is a justified instrument. We also find no sign of serial correlation in AR(2), though we find some in AR(1). The residual estimates for the first differenced dependent variable () can still possibly be correlated with those in the first differenced dependent variable by lagged one period () through a share of , which means by the definition of the data generation process, E( 0 for AR(1). However, we should expect E( 0 for AR(2) as evidence for no serial correlation.

1. **Long-Term Effect of the Arellano-Bond Difference GMM Estimator**

The Arellano-Bond difference GMM model estimates the short-term effect of a variable, but it also allows us to estimate a long-term effect. For example, in eq.1 from the main text (the model for subsidy transfers), the coefficient estimator β measures the instant effect (or the short-run effect) of on . Yet, the model also includes . As such, can also affect through the lagged dependent variable. Then, the estimated effect of partisan alignment will be \*β . In the same way, affects in the next term, which can be calculated as \*β. If this dynamic process continues, the cumulative effect (or the long-run effect) of sums to β, where β indicates the instantaneous effect of partisan alignment and denotes the coefficient estimate for the lagged dependent variable (subsidy transfers). () is a convergence rate.

As discussed in the paper, the main independent variables have significant long-term effects as well as short-term effects. We calculated the overall partisan effects based on the long-run effect, β. Based on eq.1 (in the main text), we first calibrated the long-run effect of *ALIGNMENT* on *SUBSIDYPC* in reference to Table 1 [6] from the maintext. After that, we plugged this value of β, as subsidies if alignmed, into our calibration for the long-run effect of *CENTRIST* and *SUBSIDYPC* on *SPENDINGPC* according to eq.2:

+ \*β

This additive formula allowed us to compute the amount of expected regional social spending (spearately for SSWPC using Table 2 [12] and for EDUPC using Table 3 [17]). To calculate the overall partisan effects in Gyeonggi Province, we summed up these calculated SSWPC and EDUPC and multiplied it with the total population in 2015. The estimated overall effect is ₩2,518,956 million ($2,133 million).

Control variables also have some meaningful short-term and long-term effects. The unreported short-term and long-term effects of control variables are the following. In Table 1 both *REVENUEPC* and *LOGPOP* are negatively and significantly associated with the subsidy transfers, while *RGDPPC* ispositively and strongly related to them. According to the results in Model [6], if a region’s annual growth rate of *REVENUEPCPC* is retained upwardly by ₩96,842 ($82) (i.e., one standard deviation), the central government is expected to reduce *SUBSIDYPC* to the region by ₩11,443 ($10). Similarly, a region with an annual population growth of 0.8 percent (one standard deviation) would have fewer *SUBSIDYPC* than a region with no population growth by ₩21,361 ($18). More substantively, if *RGDPPC* grows by ₩1.2 million ($1,020) (one standard deviation), the central government is likely to transfer additional *SUBSIDYPC* by ₩51,812 ($44).

In the long-run, substantively more meaningful effects on subsidy transfers are attributed to the size of regional productivity (*RGDPPC*) than to that of regional budgets (*REVENUEPC*) or demographic pressures (*LOGPOP*). This comparison is highlighted by Model [6]. For example, if *RGDPPC* increases by ₩10.2 million or $8,641 (one standard deviation), subsidy transfers per capita, in the long run, increase by roughly ₩438,759 (or $372) per capita, which is almost 48 percent of the average level of the subsidy transfers. On the other hand, if a regional government’s revenue increases by roughly ₩404,919 or $343 per capita (one standard deviation), the subsidy transfers to the region will decrease by ₩77,532 (about $67) per capita, which is 8.4 percent of the average annual rate of the subsidy transfers. To a region with a population increase of 3 million (one standard deviation), the log-linear estimate of the subsidy transfers will be an additional ₩27,875 (about $33) per capita, which is almost 3.1 percent of the average per capita subsidy transfers.

In Table 2 from the paper, we also find that regional revenues have significant long-term effects on social welfare spending. According to the results in Model [12], if regional revenue grows by roughly ₩96,842 (or $82) per capita (one standard deviation), *SSWPC* is expected to diminish by an additional ₩5,202 (roughly $5). This comparative statistic shows that a region with larger *REVENUEPC* actually expands its *SSWPC* at a slower pace than do the others. In the long run, if a region increases its revenue level by ₩404,919 ($343) per capita (one standard deviation), that region is expected to experience a reduction of SSW spending of ₩78,917 (roughly $67) per capita, which is about 50 percent of the average level of SSW spending (₩154,780). This result suggests that a region with higher locally raised revenues (other than subsidies) per capita actually expands its SSW spending at a slower pace than do the others.

Among several controls for education spending variations as shown in Table 3 from the maintext, *RGDPPC*, *LOCALVOTE,* and *LOCALCOMP* have meaningful short-term and long-term effects on EDUPC. According to the results in Model [17], if *RGDPPC* increases at a rate of ₩1.2 million ($1,019), the regional government is anticipated to expand *EDUPC* by an additional ₩11,681 ($10). Yet, the substantive effect of *LOCALVOTE* and *LOCALCOMP* on *EDUPC* is substantively small, amounting to about 5 percent and 3 percent of the average growth in *EDUPC* (in Models [14] and [15], respectively). In the long-term, with a per capita increase in *RGDPPC* by one standard deviation (aforementioned), the regional government is expected to spend additionally on education by ₩278,022 (about $235) per capita, equivalent to 28 percent of the average *level* of regional education spending per capita. Compared to *RGDPPC,* the long-run effect of *LOCALVOTE* and *LOCALCOMP* is much smaller but significantly negative, amounting to only 7 percent and 7.3 percent of the average regional education spending per capita. As an illustration of this long-run estimate, we predict that for those governors or mayors who obtained an additional 13 percent of their vote support in the previous election (one standard deviation), the regional government is anticipated to have a reduction of local education spending by $69,983 ($59) per capita. If the marginal vote gains of those local executives increase by 23 percent (one standard deviation), the governance expects a further reduction to $71,403 ($61) per capita. These results imply the politicization of local education spending in electorally more competitive regions.

1. **Robustness Tests**

We also tested the robustness of the empirical results in various ways. First, we use the Arellano-Bover/Blundell-Bond system estimator (Arellano and Bover 1995; Blundell and Bond 1998), which combines the instruments of the first difference equation with additional instruments of the untransformed equation in level. Dealing with the number of those instruments, the system GMM estimator improves efficiency in fitting a model as compared to the first difference GMM estimator. Second, we use different measurements of the main variables. For the measure of subsidy transfers to regional governments, we use NTS and LS as two separate categories. We use them separately for either the dependent variables or the independent variables. Third, we substitute the measure of relative education demands (the size of the regional population aged under 15 as compared to that aged over 64) for the size of the regional population as a measure of aggregated demands. Finally, we include Jeju Island and Sejong City for our extended data analysis.

Table E below reports dynamic panel data analysis for the key variable effects. The first column shows a list of robustness testing categories. The remaining three columns explain the subsidy equation (eq.1), SSW, and education equation (eq.2). Under each of the enlisted variable names, we present coefficient estimates along with their standard errors in the parentheses. In general, these extended results are not qualitatively different from our main findings. Note that the division of total subsidies into NTS and LS reveals further complexity, especially in education spending. However, the centrist effects remain robustly intact.

Table E. Robustness Checks for the Main Variable Effects

|  |  |  |  |
| --- | --- | --- | --- |
| Types of Robustness Tests | Subsidy Transfers  Model | SSW Spending  Model | Education Spending Model |
|  |  |  |  |
| Arellano-Bover / Blundel-Bond Estimator | *ALIGNMENT* (t) | *CENTRIST* (t) | *CENTRIST* (t) |
| 0.718 (0.028) \*\*\* | 0.026 (0.006) \*\*\* | 0.094 (0.026) \*\*\* |
|  | *SUBSIDYPC* (t-1) | *SUBSIDYPC* (t-1) |
| 0.033 (0.015) \*\* | 0.088 (0.035) \*\*\* |
|  |  |  |  |
| NTS (Dependent Variable) | *ALIGNMENT* (t) |  | |
|  | 0.039 (0.013) \*\*\* |
| LS (Dependent Variable) | *ALIGNMENT* (t) |
|  | -0.007 (0.006) |
|  |  |  |  |
| NTS (Independent Variable)  LS (Independent Variable)  Dependency Ratio (Alternative Control for Education Spending) |  | *CENTRIST* (t) | *CENTRIST* (t) |
| 0.027 (0.007) \*\*\* | 0.048 (0.022) \*\*\* |
| *NTSPC* (t-1) | *NTSPC* (t-1) |
| 0.054 (0.032) \*\* | -0.064 (0.020) \*\*\* |
| *LSPC* (t-1) | *LSPC* (t-1) |
| 0.111 (0.032) \*\*\* | 0.725 (0.202) \*\*\* |
|  |  |  |  |
| Including samples of Jeju Island and Sejong City | *ALIGNMENT* (t) | *CENTRIST* (t) | *CENTRIST* (t) |
| 0.020 (0.015) \* | 0.027 (0.010) \*\*\* | 0.034 (0.021) \* |
|  | *SUBSIDYPC* (t-1) | *SUBSIDYPC* (t-1) |
| 0.114 (0.050) \*\* | 0.068 (0.030) \*\* |
|  |  |  |  |

Notes:

Arellano-Bover / Blundel-Bond estimator (Stata command: xtdpdsys with the variance estimator for GMM estimation)

Robust standard errors are in the parenthesis.

One-tailed significance tests at \*\*\* p≤0.01, \*\*p≤0.05, \*p≤0.1.

1. **Health Expenditures in Local Governments**

We do not include local health expenditures for the following reasons. First, healthcare expenditures in Korea have been spent mostly at the national level. National healthcare insurance in Korea has provided universal healthcare coverage to the entire population since 1989. Local healthcare spending covers mostly medical and healthcare services, along with food and medicine safety. Although local healthcare expenditures increased from 0.3% of the GDP in 1980 to 0.5% of the GDP in 2015 (OECD Regional Statistics), they were only 13.8 percent of total health expenditures in South Korea (as of 2015).

Second, healthcare expenditures are generally influenced more by demographic changes than by deliberate policy changes. The national health expenditures in Korea have grown with the increase in the aged population. We also expect that there would be few partisan differences with respect to local healthcare spending. Although the conservative NFP (or former GNP) generally pursues growth-oriented and business-friendly partisan policies, one of its core constituents is the aged population, who are the primary beneficiaries of healthcare services. Therefore, to gain their votes, the rightist chief executives of regional governments have strong incentives to expand health expenditures. Thus, the policy impact of leftist parties in government is likely to be weaker in terms of the determinants of expansionary healthcare expenditures. We analyzed the data and found that neither subsidy transfers nor centrist ideology has significant effects on regional health expenditures from 2008 and 2015.

**8. The Literature on Local Social Spending in Korean**

As the political system in Korea became more decentralized, an increasing number of studies, published in Korean, have elaborated on the political determinants of local social spending distribution (e.g., Kim and Noh 2014; Yu and Kim 2015; Kwon 2005; Seo 2015; Kwon and Cha 2012; Kim and Lee 2013; Moon and Lee 2015). Just as we discussed in the paper, the studies in Korean also focus on two major political determinants: 1) partisan policy and 2) electoral competition. The first group of studies argues that the partisan orientation of the local executive and/or local legislatures is an important determinant of local social welfare spending (Kim and Noh 2014; Kim and Lee 2013; Yang et al. 2020; Yu and Kim 2015). The other group of scholars maintains that electoral competition is a more important determinant of local social spending than partisan orientation (Kwon and Cha 2012; Kim and Lee 2013; Seo 2015; Moon and Lee 2015). Still, few studies in Korean identify how political dynamics affect the delivery of fiscal resources from the central government through local government channels to regional residents. That said, empirical assessments are also mostly subject to specific time periods or sub-regional areas.

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