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The sectoral impact of public investment in the Western Balkans

Alexandra Bykova, Mario Holzner and Branimir Jovanović



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ALEXANDRA BYKOVA
MARIO HOLZNER
BRANIMIR JOVANOVIĆ

Alexandra Bykova is Head of Statistics and Economist at the Vienna Institute for International Economic Studies (wiiw). Mario Holzner is the Executive Director of wiiw. Branimir Jovanović is Economist at wiiw.

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Abstract

This note analyses the sectoral impact of public investment in the Western Balkans. It examines whether public gross fixed capital formation (GFCF) crowds in or crowds out overall and private investment, as well as investment across sectors and different types of assets, and whether the relationship differs from that observed in EU member states in Central, East and Southeast Europe (CESEE). Using data from the wiiw Annual Database, Eurostat and national statistical offices for the 1995-2025 period, the analysis estimates dynamic fixed-effects error correction models for total and private GFCF, sectoral GFCF, and GFCF by type of investment. The results indicate that public investment in the Western Balkans is strongly associated with higher total and private investment, and that the relationship is stronger than in the CESEE EU member states, which can be explained by the fact that the Western Balkans still face larger infrastructure gaps and poorer infrastructure quality. The sectoral results suggest crowding-in effects in manufacturing, transport, and public administration and defence, with notable negative effects in professional, scientific and technical activities. By type of investment, public investment is positively linked to all types of investment, with the strongest links in construction, structures and machinery in that order. The findings suggest that public investment can support productive capacity and structural transformation in the Western Balkans, but also that certain links with the service sector should be improved, in order for the effects to be even stronger.

Keywords: public investment, private investment, crowding in, infrastructure, Western Balkans

JEL classification: E22, H54

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The sectoral impact of public investment in the Western Balkans

1. INTRODUCTION

This Policy Note analyses the sectoral impact of public investment in the Western Balkans. More specifically, it asks whether public gross fixed capital formation (GFCF) crowds in or crowds out overall and private investment as well as investment across sectors and different types of assets. It also examines whether this relationship differs from that observed in EU members states in Central, East and Southeast Europe (CESEE).

A growing body of literature suggests that public investment can generate significant macroeconomic benefits and often crowds in private investment rather than displacing it. For advanced economies, Abiad et al. (2015) show that public infrastructure investment raises output, stimulates private investment and reduces unemployment, especially when there is economic slack, accommodative monetary policy and high investment efficiency. Matvejevs and Tkacevs (2023) similarly find that, across advanced economies, each additional dollar of public investment is associated with around two dollars of private investment in the long run. Evidence for developing economies points in the same direction. Francois et al. (2024) find that public investment has sizeable crowding-in effects, especially in countries with large infrastructure gaps. For Europe and the Western Balkans, Revoltella et al. (2016) highlight the role of infrastructure in supporting regional growth and market access, while Holzner and Schwarzhappel (2018) document the region's chronic infrastructure underinvestment and argue for a stronger investment push. More recently, Holzner (2026) has suggested that public infrastructure investment can act as a catalyst for economic transformation and convergence in the Western Balkans.

A previous wiiw Policy Note (Gutzianas et al. 2026) examined whether public infrastructure investment crowds in private investment in the Western Balkans. That paper found that public infrastructure investment is generally associated with higher private investment in the region, and that the relationship is broadly similar to that observed in the EU. It also showed that the strength of the effect differs across sectors, with relatively strong crowding-in effects seen in education and information and communication; more moderate effects in energy, water and waste, and transport; and weaker effects in health.

The present note builds on Gutzianas et al. (2026) and takes the analysis further in several ways. First, it uses a broader concept of public investment, focusing on public GFCF rather than only infrastructure-related investment. Second, it examines not only private investment, but also total investment, sectoral investment, and investment by type of asset. Third, it uses a different empirical framework, based on dynamic fixed-effects error correction models, which allows us to distinguish between short- and long-run relationships. Finally, instead of comparing the Western Balkans with the EU as a whole, the benchmark group consists of EU member states in CESEE, which together provide a more relevant comparison group for the region.

The analysis looks at total GFCF, private GFCF, and investment by sector and by type of asset.

This allows us to move beyond the broad crowding-in versus crowding-out question to examine where the effects of public investment are strongest. This is important for the Western Balkans, as the region continues to face sizeable investment needs and slow convergence with EU living standards. Public investment is expected to play an important role in addressing these constraints. Its impact, however, depends not only on its size, but also on whether it stimulates additional investment in productive sectors.

Moreover, the estimate for the Western Balkans are benchmarked against a control group of EU member states in CESEE in order to assess whether the effects are stronger in the region. This is particularly relevant, as well-targeted public investment may have stronger crowding-in effects in less developed economies with larger infrastructure gaps than in more advanced economies. We therefore assess whether this is indeed the case in the Western Balkans.

The remainder of the note is structured as follows. Section 2 describes the data and the empirical strategy. Section 3 offers a first descriptive look at the data. Section 4 presents the econometric results. Section 5 summarises the findings and discusses policy implications.

2. DATA AND EMPIRICAL STRATEGY

The analysis draws on data from the wiiw Annual Database, Eurostat and national statistical offices. The main outcome variable is gross fixed capital formation (GFCF), that is, investment in fixed assets excluding inventories, expressed as a share of GDP. We analyse several measures of investment: total GFCF, private GFCF, GFCF by NACE Rev. 2 sectors, and GFCF by type of asset.

The main explanatory variable is public GFCF, also expressed as a share of GDP. The aim is to assess whether higher public investment is associated with higher or lower levels of other investment. In other words, we examine whether public investment crowds in or crowds out total, private, sectoral and asset-specific investment.

The analysis is carried out on a sample of CESEE countries, including both EU member states and the Western Balkans. The regressions are estimated on the full sample, with an interaction term between public GFCF and a Western Balkans dummy. In this specification, the coefficient on public GFCF captures the relationship for the benchmark group of EU member states in CESEE, while the interaction term shows whether this relationship differs in the Western Balkans. The Western Balkan economies covered by the dataset are Albania, Kosovo, North Macedonia and Serbia, depending on data availability. The period covered by the analysis is 1995-2025, again depending on data availability.

In addition to the main explanatory variable (i.e. public GFCF), the model includes a set of control variables that capture financial, cyclical and structural economic conditions. Financial conditions are proxied by credit depth, measured as loans to the non-financial private sector as a share of GDP, and by the central bank policy interest rate. The economic cycle is captured by consumer price inflation and the unemployment rate. Finally, exports of goods and services and household final consumption, both expressed as shares of GDP, are included as broader structural indicators of the economy.

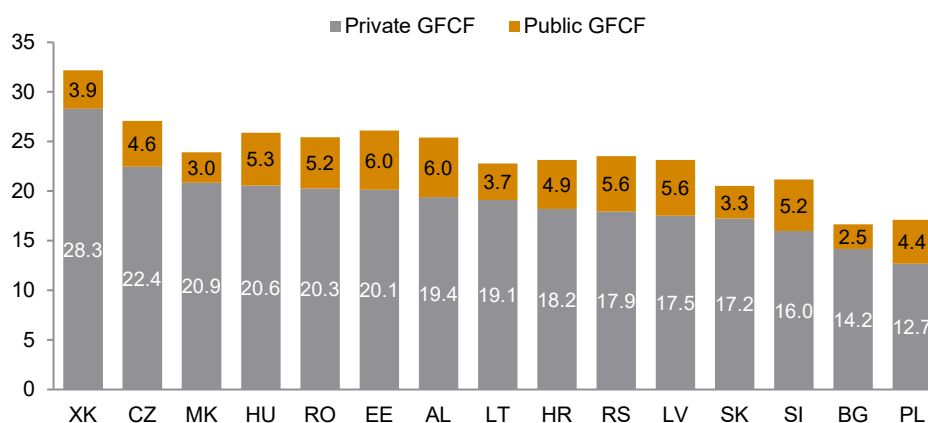
Empirically, we estimate a dynamic fixed-effects error correction model (ECM). This specification is appropriate for the analysis because it allows us to distinguish between short-run and long-run relationships while also reducing concerns related to possible unit-root behaviour in the data. The dependent variable is the first difference of the relevant investment variable. The explanatory variables include the lagged level of the dependent variable, the lagged levels of the explanatory variables, and their first differences. All specifications include country and year fixed effects, and robust standard errors are used.

The regression tables report the coefficients on the lagged levels of the explanatory variables, which capture the longer-run relationships of interest. The constant, the first-difference terms, and the country and year fixed effects are included in the estimations but not reported. Since the variables are expressed in percentage points (pp) of GDP, the interpretation of the coefficients is straightforward: a one pp increase in a given explanatory variable is associated with the corresponding pp change in the investment share, depending on the sign and size of the coefficient.

3. A FIRST LOOK AT THE DATA

Before turning to the econometric results, it is useful to look at the recent structure of investment in the economies covered by the analysis. Figure 1 shows the average shares of private and public GFCF in GDP in the 2021-2025 period. The Western Balkan economies display relatively high investment shares, ranging from 24% of GDP in Serbia and North Macedonia to 32% in Kosovo. However, the composition differs across countries. Kosovo stands out with a high share of private GFCF (28% of GDP) and a relatively low share of public GFCF (4%). Albania and Serbia are the opposite, with a high share of public GFCF (6%) and low share of private GFCF (18-19%). North Macedonia is in between, with moderate shares of both (21% and 3%, respectively). Public GFCF is also sizeable in parts of the region, at around 6% of GDP in Estonia and Latvia as well as around 5% in Hungary, Romania, Croatia, Slovenia and Czechia, which makes the question of its effect on other forms of investment particularly relevant.

Figure 1 / Share of private and public GFCF in % of GDP, average 2021-2025

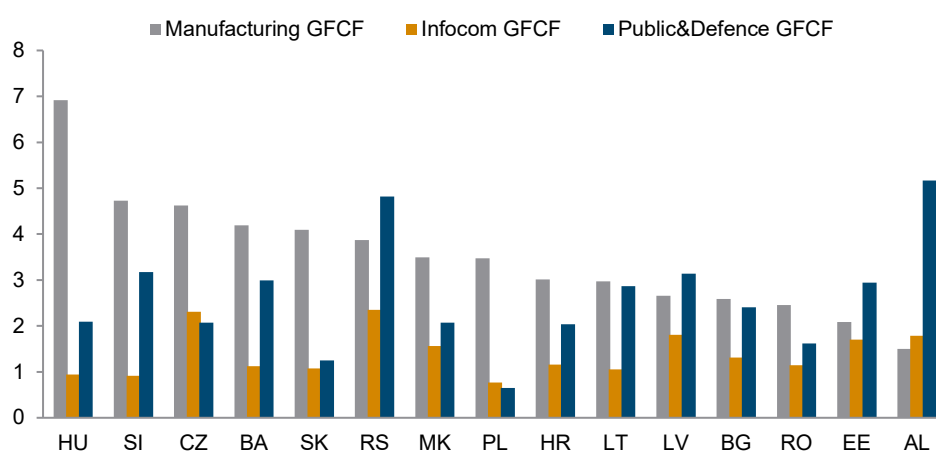


Note: Average according to years available.

Sources: wiiw Annual Database, Eurostat, national statistical offices, own calculations.

Figure 2 shows selected sectoral GFCF shares. Concretely, the shares for manufacturing, information and communication as well as of public administration, defence and compulsory social security are shown as a percentage of GDP. The figure suggests that Western Balkan countries have relatively diverse investment patterns across these sectors. Manufacturing investment is sizeable in Bosnia and Herzegovina and Serbia (close to 4% of GDP), while Albania records a relatively high share of investment in public administration and defence (5%). Serbia also has a relatively high share of investment in information and communication (more than 2%). North Macedonia has moderate shares of investment in all three of the sectors analysed here. These patterns may be useful later on to explain the effects of public investment on some of these sectors.

Figure 2 / Share of selected sectoral GFCF in % of GDP, average 2021-2025



Note: Average according to years available. NACE Rev. 2 sectors C, J and O.

Sources: wiiw Annual Database, Eurostat, national statistical offices, own calculations.

Figure 3 / Share of GFCF in machinery and equipment and weapons systems in % of GDP, average 2021-2025



Note: Average according to years available.

Sources: wiiw Annual Database, Eurostat, national statistical offices, own calculations.

Figure 3 presents investment in machinery and equipment and weapons systems. This category is important because it is closely related to productive capacity, industrial upgrading and, in some cases, defence-related investment. Bosnia and Herzegovina and Serbia are among the economies with relatively high shares of this type of investment, of close to 10% of GDP. Albania, on the other hand, is at the lower end of the distribution, with this investment constituting 6% of GDP. Kosovo and North Macedonia are in between, at around 8% of GDP.

4. ECONOMETRIC ANALYSIS

This section presents the econometric results, starting with the broadest investment measures and then moving to more disaggregated ones. We first examine total and private GFCF, then turn to investment by sector, and finally analyse investment by type of asset.

We estimate a time-series cross-section dynamic fixed-effects error correction model (ECM). This type of model has been used in the political economy literature, such as by Kristal (2010) and Bengtsson (2014). ECMs are often applied when cointegration may be an issue, as they offer methodological advantages when the possibility of unit-root behaviour in the data cannot be rejected. However, their use is not limited to such cases. A key advantage of the ECM framework is that it allows us to distinguish between short-run and longer-run relationships. The model is specified as follows:

$$\Delta GFCF_{it} = \alpha + \beta_1 GFCF_{it-1} + \beta_2 \Delta control_{it} + \beta_3 control_{it-1} + \beta_4 \Delta publicGFCF_{it} + \beta_5 publicGFCF_{it-1} + \beta_6 \Delta WB \cdot publicGFCF_{it} + \beta_7 WB \cdot publicGFCF_{it-1} + country_i + year_t + \varepsilon_{it}$$

The dependent variable, $\Delta GFCF_{it}$, is the first difference of GFCF as a share of GDP for country i in year t . Depending on the specification, this refers to total GFCF, private GFCF, sectoral GFCF, or GFCF by type of asset. The explanatory variables include the lagged level of the dependent variable, the lagged levels and first differences of the control variables, and the lagged levels and first differences of the main variables of interest (i.e. public GFCF and its interaction with the Western Balkans dummy).

The control variables capture financial, cyclical and structural economic conditions. Financial conditions are proxied by credit depth, measured as loans to the non-financial private sector as a share of GDP, and by the central bank policy interest rate. The economic cycle is captured by consumer price inflation and the unemployment rate. Finally, exports of goods and services and household final consumption, both expressed as shares of GDP, are included as broader structural indicators of the economy.

All specifications include country and year fixed effects as well as an error term. Standard errors are estimated robustly. The regression tables do not report the constant, the first-difference terms, or the country and year fixed effects. The focus is instead on the lagged-level coefficients, which capture the longer-run relationships of interest.

The benchmark group consists of EU member states in CESEE, while the Western Balkans effect is captured through the interaction term between public GFCF and the Western Balkans dummy. The Western Balkan economies included in the analysis are Albania, Kosovo, North Macedonia and Serbia, depending on data availability. The period covered is 1995-2025, again depending on data availability.

Since all variables, except the dummy variables, are expressed in pp of GDP, the interpretation of the coefficients is straightforward. A one-pp increase in a given explanatory variable is associated with the corresponding pp change in the investment share, depending on the sign and size of the coefficient.

4.1. Total and private investment

Table 1 reports the results for total and private GFCF. Specifications 1 and 2 explain total GFCF, with and without the Western Balkans interaction term. Specifications 3 and 4 repeat the same exercise for private GFCF. The lagged level of the dependent variable is highly significant in all specifications and has a negative coefficient, indicating a mean-reverting process.

The control variables show a fairly consistent pattern across the different specifications. Interest rates have a strong negative association with investment. Higher unemployment and greater export openness are also associated with lower investment shares in several specifications. Inflation, perhaps surprisingly, has a positive coefficient, suggesting that higher inflation is associated with higher investment shares, although the effect is only significant at the 10% level.

Turning to public investment, the results show a strong positive association with total investment. In specification 1, a one-pp increase in public GFCF is associated with a 0.44-pp increase in total GFCF. Once the Western Balkans interaction is included, the baseline coefficient remains positive, while the interaction term is also positive and weakly significant. This suggests that the effect of public investment on total investment is stronger in the Western Balkans than in the selected EU member states in CESEE. One possible explanation is that the Western Balkans still face larger infrastructure gaps and poorer infrastructure quality, which means that infrastructure constraints may limit private investment more strongly there. Hence, the marginal impact of public investment may be stronger. This interpretation is consistent with Atoyan et al. (2018), who document weaker infrastructure quality in the Western Balkans compared with the EU. It is also in line with Holzner and Schwarzhappel (2018), who identify sizeable infrastructure gaps in the region.

The results for private investment are more nuanced. Public investment is not statistically significant for private GFCF in the specification that does not distinguish the Western Balkans from the control group. However, once the interaction term is included, the Western Balkans effect is positive and significant. This suggests that public investment has a stronger crowding-in effect on private investment in the Western Balkans than in the CESEE EU control group. The estimated additional effect is around 0.38 pp, implying that one pp more in public investment is associated with roughly 0.4 pp more private GFCF in the region. Again, this may reflect the larger infrastructure gaps and poorer infrastructure quality in the Western Balkans as well as the greater scope for public investment to stimulate additional private investment.

Table 1 / Relationship between public investment and total/private investment

	(1) D.investment	(2) D.investment	(3) D.private investment	(4) D.private investment
L.investment	-0.388*** (0.058)	-0.374*** (0.055)		
L.private investment			-0.388*** (0.058)	-0.374*** (0.055)
L.credit depth	0.002 (0.013)	-0.001 (0.013)	0.002 (0.013)	-0.001 (0.013)
L.interest	-0.135*** (0.035)	-0.126*** (0.031)	-0.135*** (0.035)	-0.126*** (0.031)
L.inflation	0.071* (0.034)	0.066* (0.034)	0.071* (0.034)	0.066* (0.034)
L.unemployment	-0.060* (0.032)	-0.071* (0.034)	-0.060* (0.032)	-0.071* (0.034)
L.export openness	-0.037* (0.021)	-0.031 (0.021)	-0.037* (0.021)	-0.031 (0.021)
L.household demand	-0.003 (0.058)	0.016 (0.055)	-0.003 (0.058)	0.016 (0.055)
L.public investment	0.440*** (0.145)	0.346* (0.168)	0.052 (0.117)	-0.028 (0.143)
L.WB public investment		0.376* (0.202)		0.376* (0.202)
First differences	X	X	X	X
Time fixed effects	X	X	X	X
Country fixed effects	X	X	X	X
Observations	319	319	319	319
R ²	0.681	0.692	0.628	0.642

Notes: Robust standard errors are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

All specifications include first differences, time fixed effects and country fixed effects. The dependent variables and explanatory variables are expressed as a percentage of GDP.

4.2. Sectoral effects

Tables 2 and 3 report the results for selected sectors. For reasons of space, we only show the sectors in which public investment or its interaction with the Western Balkans dummy is statistically significant. The findings are more differentiated than in the aggregate regressions, suggesting that the effect of public investment varies considerably across sectors.

In all sectors shown in Table 2, public investment has a positive estimated effect on sectoral investment in the Western Balkans. In manufacturing, transport, and information and communication, the coefficient for the CESEE EU control group is not statistically significant, while the Western Balkans interaction is positive and statistically significant. This suggests that public investment in the Western Balkans is associated with additional investment in these three sectors relative to the EU control group. These are important results, as they point to possible crowding-in effects in sectors closely linked to productivity, connectivity and structural transformation.

For water supply, sewerage, waste management and remediation, the public-investment coefficient for the control group is positive and weakly significant, while the Western Balkans interaction is not statistically significant. This suggests that the effect in this sector is not clearly different in the Western Balkans from that observed in the EU control group. Still, the estimated overall effect for the Western Balkans remains positive, as the sum of the two coefficients is positive and significant. The crowding-in effect in the Western Balkans is strongest for transport and then manufacturing.

Table 2 / Sectoral effects of public investment: manufacturing, water, transport, and information and communication

	(5) Manufacturing	(6) Water	(7) Transport	(8) Infocom
L.dependent investment	-0.454*** (0.072)	-0.713*** (0.058)	-0.536*** (0.078)	-0.446*** (0.060)
L.credit depth	-0.002 (0.003)	0.001 (0.001)	-0.001 (0.004)	-0.002 (0.003)
L.interest	-0.008 (0.025)	0.008 (0.012)	0.024* (0.012)	-0.003 (0.014)
L.inflation	0.019 (0.024)	-0.002 (0.010)	-0.026** (0.012)	-0.002 (0.011)
L.unemployment	0.027 (0.024)	0.010 (0.006)	-0.010 (0.022)	-0.005 (0.008)
L.export openness	-0.007 (0.012)	0.001 (0.004)	-0.003 (0.006)	-0.004 (0.005)
L.household demand	-0.046* (0.023)	-0.014 (0.009)	-0.037 (0.022)	0.009 (0.012)
L.public investment	0.086 (0.081)	0.068* (0.033)	0.078 (0.044)	-0.052 (0.031)
L.WB public investment	0.149** (0.051)	-0.011 (0.044)	0.165** (0.075)	0.071** (0.030)
First differences	X	X	X	X
Time fixed effects	X	X	X	X
Country fixed effects	X	X	X	X
Observations	303	302	302	303
R ²	0.480	0.502	0.437	0.500

Notes: Robust standard errors are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

All specifications include first differences, time fixed effects and country fixed effects. The dependent variables and explanatory variables are expressed as a percentage of GDP.

Table 3 presents the results for several service-related sectors. In all of the four sectors shown – professional, scientific and technical activities; public administration, defence and compulsory social security; education; and arts, entertainment and recreation – public investment has a positive effect in the control group. This suggests that, in the selected EU member states in CESEE, public investment tends to crowd in investment in these service sectors.

The pattern is different in the Western Balkans. The interaction term is negative and statistically significant in three sectors: professional, scientific and technical activities; education; and arts, entertainment and recreation. This implies that the crowding-in effect observed in the CESEE EU control group is much weaker in the Western Balkans. In education and in arts, entertainment and recreation,

the implied overall effect for the Western Balkans is close to zero. In professional, scientific and technical activities, the implied effect is negative, suggesting that public investment may even crowd out investment in this sector. A likely interpretation is that public investment in the Western Balkans is less closely connected to these service activities than it is in the more advanced EU economies.

Public administration, defence and compulsory social security is an exception to this pattern. In this sector, the Western Balkans interaction is positive and statistically significant, indicating a stronger crowding-in effect in the Western Balkans than in the CESEE EU control group. This suggests that infrastructure gaps and poorer infrastructure quality constrain investment in this sector more strongly in the Western Balkans, with the result that additional public investment has a larger marginal effect.

Table 3 / Sectoral effects of public investment: professional services, public administration and defence, education, and recreation

	(9) Professional	(10) Admin & defence	(11) Education	(12) Recreation
L.dependent investment	-0.562*** (0.046)	-0.491*** (0.069)	-0.488*** (0.082)	-0.577*** (0.073)
L.credit depth	-0.001 (0.002)	0.000 (0.004)	0.001 (0.000)	-0.001 (0.001)
L.interest	0.006 (0.019)	-0.016 (0.020)	-0.007 (0.005)	-0.007 (0.004)
L.inflation	-0.010 (0.019)	0.011 (0.018)	0.008 (0.005)	0.002 (0.005)
L.unemployment	-0.006 (0.009)	-0.015 (0.017)	0.001 (0.004)	-0.008* (0.004)
L.export openness	-0.001 (0.007)	0.014** (0.006)	0.001 (0.002)	-0.004 (0.002)
L.household demand	0.016* (0.009)	0.005 (0.015)	0.007 (0.006)	-0.009* (0.004)
L.public investment	0.053** (0.021)	0.204*** (0.051)	0.034*** (0.010)	0.030* (0.015)
L.WB public investment	-0.177** (0.077)	0.344** (0.114)	-0.035** (0.013)	-0.037* (0.018)
First differences	X	X	X	X
Time fixed effects	X	X	X	X
Country fixed effects	X	X	X	X
Observations	302	302	302	302
R ²	0.366	0.625	0.487	0.433

Notes: Robust standard errors are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

All specifications include first differences, time fixed effects and country fixed effects. The dependent variables and explanatory variables are expressed as a percentage of GDP.

4.3. Investment by type of asset

Table 4 presents the results by type of investment. Public investment is positively associated with all three types of investment in the Western Balkans, although the pattern differs across asset categories.

For construction investment and other buildings and structures, public investment has a positive and statistically significant effect in the CESEE EU control group. The Western Balkans interaction is positive but not statistically significant, suggesting that the effect in the Western Balkans does not differ clearly from that observed in the control group. In other words, public investment appears to crowd in construction-related investment both in the CESEE EU member states and in the Western Balkans.

For machinery, equipment and weapons systems, however, the pattern is different. The coefficient for the CESEE EU control group is not statistically significant, while the Western Balkans interaction is positive and significant. This suggests that public investment in the Western Balkans is also associated with higher investment in machinery and equipment. One possible explanation is that public investment in the region may help alleviate infrastructure and production bottlenecks that are particularly relevant for firms' decisions to invest in machinery and equipment. Better infrastructure and transport links may raise the expected return on such investment, thereby encouraging higher investment in machinery and equipment.

Table 4 / Effects of public investment by type of investment

	(13) Construction	(14) Structures	(15) Machinery
L.dependent investment	-0.417*** (0.081)	-0.407*** (0.074)	-0.415*** (0.057)
L.credit depth	0.010 (0.009)	0.008 (0.007)	-0.008 (0.006)
L.interest	-0.084* (0.047)	-0.078* (0.040)	-0.048 (0.031)
L.inflation	0.040 (0.024)	0.028 (0.024)	0.037 (0.028)
L.unemployment	-0.038** (0.018)	-0.039 (0.029)	-0.030 (0.023)
L.export openness	-0.035 (0.023)	-0.020 (0.016)	-0.002 (0.013)
L.household demand	-0.019 (0.041)	-0.054* (0.029)	0.011 (0.022)
L.public investment	0.358*** (0.091)	0.296*** (0.075)	0.068 (0.101)
L.WB public investment	0.117 (0.182)	0.110 (0.224)	0.182* (0.100)
First differences	X	X	X
Time fixed effects	X	X	X
Country fixed effects	X	X	X
Observations	316	308	316
R ²	0.616	0.538	0.593

Notes: Robust standard errors are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

All specifications include first differences, time fixed effects and country fixed effects. The dependent variables and explanatory variables are expressed as a percentage of GDP.

Comparing the three types of investment, the strongest estimated effect in the Western Balkans is found for construction, followed by other buildings and structures, and then machinery, equipment and weapons systems. This is broadly expected given that public GFCF is closely linked to infrastructure- and construction-related investment. Still, the positive association with machinery and equipment is important, as it suggests that public investment may also support productive capacity beyond construction alone.

5. SUMMARY AND POLICY IMPLICATIONS

This note analyses the sectoral impact of public investment in the Western Balkans and compares the results with EU member states in Central, East and Southeast Europe (CESEE). It examines whether public gross fixed capital formation (GFCF) crowds in or crowds out total investment, private investment, sectoral investment, and investment by type of asset. Several key findings emerge.

First, public investment in the Western Balkans is strongly associated with higher total investment. The results suggest that the effect is stronger than in the CESEE EU member states, which may reflect the larger infrastructure gaps and poorer infrastructure quality in the Western Balkans as well as the greater scope for public investment to generate additional capital formation. This finding provides support for the view that public investment can play an important role in the region's development.

Second, the results also point to a positive relationship between public and private investment in the Western Balkans. While public investment is not statistically significant for private GFCF in the specification that does not distinguish the Western Balkans from the control group, the Western Balkans interaction is positive and significant. This suggests that public investment has a stronger crowding-in effect on private investment in the region than in the CESEE EU control group. Again, this may be linked to the infrastructure gaps and quality in the Western Balkans, where well-targeted public investment can alleviate bottlenecks and raise the return on private investment.

Third, the sectoral results show that the effects of public investment are not uniform across the economy. Among the production-related sectors, the strongest estimated effects in the Western Balkans are found in transport and manufacturing, followed by water supply, sewerage and waste management, while the effect in information and communication is positive but smaller. These are important findings, as these sectors are closely linked to productivity, connectivity and structural transformation. In manufacturing, transport, and information and communication, public investment has a stronger positive effect in the Western Balkans than in the CESEE EU member states. This suggests that public investment in the region may support not only aggregate demand, but also the expansion of productive capacity in sectors that matter for long-term development.

Fourth, the results are more mixed for service-related sectors. In the CESEE EU member states, public investment tends to crowd in investment in most service sectors, including professional, scientific and technical activities; education; and arts, entertainment and recreation. In the Western Balkans, however, the implied effects in these sectors are much weaker. In education and in arts, entertainment and recreation, the overall effect is close to zero, while it is negative in professional, scientific and technical activities. This suggests that public investment in the Western Balkans is less closely

connected to these knowledge-intensive and social-service activities than in the more advanced EU economies. Strengthening these links should therefore be an important policy objective.

Fifth, public administration, defence and compulsory social security stands out as an exception among the service-related sectors. Here, the Western Balkans interaction is positive and statistically significant, suggesting a stronger crowding-in effect than in the CESEE EU control group. This may reflect recent increases in security-related investment amid heightened geopolitical tensions.

Sixth, the results by type of asset confirm that public investment is positively associated with several forms of capital formation in the Western Balkans. The strongest effects are found for construction and other buildings and structures, which is expected given the close link between public GFCF and infrastructure- and construction-related investment. More importantly, the results also suggest a positive effect on machinery and equipment in the Western Balkans. This is relevant from a development perspective, as machinery and equipment are directly linked to productive capacity.

These findings have several implications for public investment policy in the Western Balkans. The first is that scaling up public investment can be justified not only because of the region's large infrastructure and development needs, but also because public investment appears to mobilise additional investment. Concerns that public investment necessarily crowds out private investment are not supported by the results. On the contrary, the evidence points to crowding-in effects, especially in the Western Balkans.

The second implication is that public investment is likely to have different effects on different types of private investment. The results suggest stronger crowding-in effects in production-related sectors, especially transport and manufacturing, while the effects are weaker or even negative in some service-related sectors, such as professional, scientific and technical activities; education; and arts, entertainment and recreation. The results by type of asset also show that the strongest effects are found in construction and other buildings and structures, while the positive effect on machinery and equipment is smaller but important from a developmental perspective. Public investment should therefore not be assessed by its overall volume alone, but also by the sectors and types of assets it stimulates.

The third implication concerns service sectors. The weak or negative effects found for professional, scientific and technical activities; education; and arts, entertainment and recreation suggest that public investment in the Western Balkans is not yet sufficiently connected to knowledge-intensive and human-capital-related activities. This points to the need for better integration between public investment strategies, education systems, research institutions, innovation policy and domestic firms. Public investment should not only build physical infrastructure, but also support the broader ecosystem that allows private firms and institutions to benefit from it.

Finally, the results should not be interpreted as implying that simply increasing public investment will automatically maximise its economic impact. The quality of public investment management remains crucial. As discussed also in our previous note on this (Gutzianas et al. 2026), research on public investment practices emphasises the importance of the early stages of the investment cycle – especially strategic planning, project selection and budgeting – for ensuring that projects are economically justified, credibly prioritised and realistically financed. Strengthening the

institutions and procedures that govern public investment would therefore improve not only the efficiency of public spending, but also its ability to stimulate complementary private investment.

REFERENCES

- Abiad, A., Furceri, D. & Topalova, P. (2015). The macroeconomic effects of public investment: Evidence from advanced economies. IMF Working Paper No. 15/95, International Monetary Fund. <https://doi.org/10.5089/9781475578874.001>
- Atoyan, R., Benedek, D., Cabezon, E., Cipollone, G., Miniane, J., Nguyen, N., Petri, M., Reinke, J., & Roaf, J. (2018). Public infrastructure in the Western Balkans: Opportunities and challenges. Departmental Paper No. 2018/002. International Monetary Fund. <https://doi.org/10.5089/9781484337189.087>
- Bengtsson, E. (2014). Do unions redistribute income from capital to labour? Union density and wage shares since 1960. *Industrial Relations Journal*, 45(5), 389–408. <https://doi.org/10.1111/irj.12065>
- Francois, J. N. D., Konte, M. & Ruch, F. U. (2024). ‘Crowding in’ effect of public investment on private investment revisited. World Bank Policy Research Working Paper No. 10881. <https://doi.org/10.1596/1813-9450-10881>
- Gutzianas, I., Holzner, M. & Jovanović, B. (2026). Crowding in or crowding out? Public and private investment in the Western Balkans. wiiw Policy Note/Policy Report No. 104. The Vienna Institute for International Economic Studies (wiiw). <https://wiiw.ac.at/crowding-in-or-crowding-out-public-and-private-investment-in-the-western-balkans-dlp-7541.pdf>
- Holzner, M. (2026). Infrastructure investment as a catalyst for economic transformation in the Western Balkans, in: Vidačak, I. (ed.) *The Western Balkans and the challenges of EU accession: The resilient transformation*. Routledge, 217–234. <https://doi.org/10.4324/9781003717225-18>
- Holzner, M. & Schwarzhappel, M. (2018). Infrastructure investment in the Western Balkans: A first analysis. European Investment Bank & The Vienna Institute for International Economic Studies (wiiw). <https://www.eib.org/en/publications/econ-infrastructure-investment-in-the-western-balkans>
- Kristal, T. (2010). Good times, bad times: Postwar labor’s share of national income in capitalist democracies. *American Sociological Review*, 75(5), 729–763. <https://www.jstor.org/stable/20799487>
- Matvejevs, O. & Tkacevs, O. (2025). Invest one – get two extra: Public investment crowds in private investment. *European Journal of Political Economy*, 90(Part A), 102384. <https://doi.org/10.1016/j.ejpoleco.2023.102384>
- Revoltella, D., Brutscher, P.-B., Tsiotras, A. & Weiss, C. T. (2016). Linking local business with global growth opportunities: The role of infrastructure. *Oxford Review of Economic Policy*, 32(3), 410–430. <https://doi.org/10.1093/oxrep/grw019>

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