

# Türkiye's Agenda: Impact Analysis of Earthquakes

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On February 6, Türkiye was hit by two earthquakes with a magnitude of 7.8 and 7.5 nine hours apart. Mainly 10 southeastern cities of the country was harshly affected with more than 38,000 people were dead and more than 108,000 people were wounded. In total, there were 13,5 million people live in the area. 8.1 million of them were eligible to vote according to latest voters statistics (2019). This adds up 14% of the overall voters. Hence, the earthquakes will bring humanitarian, political and economic echoes in the coming period. Even though we feel that it is a bit uncomfortable to make a material analysis on these two devastating earthquakes as we lost many citizens in this disaster, we hope that our report could shed light over the foggy areas and give some answers to the questions arose during the past two weeks.

## Limited value-added effects but larger capital stock losses

■ We share a preliminary analysis on the potential economic impact of the quakes. Since we lack enough information and data, we try to replicate certain assumptions from the assessments on the previous 1999 earthquakes in the Marmara region. In Table 1 and Table 2, we summarize the economic characteristics of the region. The corresponding 10 cities are highly populated and consist of near 9% of the overall value-added, according to 2021 results. The contribution is changing from sector to sector, where agricultural and industrial output has a share of 14% and 11%, respectively. In industrial output, mostly labor intensive sectors, including textile, steel and metals pioneer.

**Table 1: Macroeconomic Aspect of the Impacted Region**

	Population	Registered employed (15-64)	Exports	Tourism	Budget Revenues	Performing Cash Loans	NPL
Adana	2.7%	4.1%	1.3%	0.3%	1.2%	1.9%	2.7%
Hatay	2.0%		1.6%	0.3%	1.7%	1.3%	1.6%
Kahramanmaraş	1.4%	2.9%	0.6%	0.0%	0.2%	0.8%	0.8%
Osmaniye	0.7%		0.2%	0.0%	0.1%	0.3%	0.3%
Malatya	1.0%		0.2%	0.0%	0.2%	0.3%	0.3%
Gaziantep	2.5%		4.6%	0.2%	0.6%	2.8%	3.1%
Adiyaman	0.7%	2.8%	0.0%	0.0%	0.1%	0.2%	0.2%
Kilis	0.2%		0.0%	0.1%	0.0%	0.0%	0.0%
Şanlıurfa	2.5%	2.3%	0.1%	0.0%	0.2%	0.6%	0.7%
Diyarbakır	2.1%		0.1%	0.1%	0.3%	0.6%	1.3%
<b>Share in Total*</b>	<b>15.7%</b>	<b>12.2%</b>	<b>8.9%</b>	<b>1.0%</b>	<b>4.6%</b>	<b>9.0%</b>	<b>11.0%</b>

\*according to latest available data

**Table 2: GDP Sectorial Decomposition in the Impacted Region (2021 levels)**

	Agriculture	Industry	Construction	Services	GDP
Adana	2.5%	2.2%	1.7%	1.9%	2.0%
Hatay	1.3%	1.8%	1.0%	1.4%	1.4%
Kahramanmaraş	1.4%	1.4%	0.8%	0.8%	0.9%
Osmaniye	0.6%	0.7%	0.3%	0.4%	0.4%
Malatya	0.9%	0.5%	0.7%	0.5%	0.5%
Gaziantep	1.3%	3.6%	1.7%	2.1%	2.0%
Adıyaman	0.8%	0.3%	0.3%	0.3%	0.3%
Kilis	0.2%	0.1%	0.1%	0.1%	0.1%
Şanlıurfa	3.0%	0.4%	0.8%	0.7%	0.8%
Diyarbakır	2.2%	0.4%	1.2%	0.8%	0.9%
<b>Share in Total</b>	<b>14.3%</b>	<b>11.2%</b>	<b>8.7%</b>	<b>9.0%</b>	<b>9.3%</b>

- We start our calculations with direct costs by means of physical capital losses. It is still not clear in numbers to calculate the overall damage but below we share how we calculate the loss in the housing stock according to the currently available officially reported numbers (as of February 16<sup>1</sup>). If we take into account pre-quake per unit (m2) house prices of each city for an average of 100m2 units, the total damage reaches 20bn\$ (2.3% of GDP) according to the currently confirmed numbers. However, if we take the 1999 Marmara quakes damage ratio as a reference and assume one third of a damage on the housing stock, the overall loss could mount up to 75bn\$ (8.6% of GDP), which is in line with the latest calculations of TURKONFED (Turkish Enterprise and Business Confederation)<sup>2</sup>.

**Table 3: Housing Stock Details & Estimated Loss**

	# of housing units (2021)	# of housing units checked	reported damaged units	% damage (as of Feb 16)	% damage estimated	# of damaged housing units estimated	m2 price in \$	housing cost bn\$ reported (100m2)	housing cost bn\$ estimated (100m2)
Adana	632,875	127,269	8,544	7%	10%	63,288	904	0.8	5.7
Hatay	449,151	239,142	89,881	38%	70%	314,406	656	5.9	20.6
Kahramanmaraş	311,458	258,523	67,722	26%	70%	218,021	648	4.4	14.1
Osmaniye	156,199	108,162	11,699	11%	10%	15,620	611	0.7	1.0
Malatya	230,499	174,293	51,613	30%	70%	161,349	622	3.2	10.0
Gaziantep	522,947	586,628	48,572	8%	20%	104,589	788	3.8	8.2
Adıyaman	155,300	115,046	40,882	36%	70%	108,710	675	2.8	7.3
Kilis	40,020	31,904	2,257	7%	10%	4,002	509	0.1	0.2
Şanlıurfa	411,421	229,605	7,432	3%	10%	41,142	607	0.5	2.5
Diyarbakır	394,867	294,814	17,027	6%	20%	78,973	687	1.2	5.4
<b>Total / Average</b>	<b>3,304,737</b>	<b>2,165,386</b>	<b>345,629</b>	<b>16%</b>	<b>34%</b>	<b>1,110,100</b>	<b>716</b>	<b>23</b>	<b>75</b>
<b>1999 Quakes (w/ 2021 adjustment)</b>	<b>1,234,511</b>				<b>37%</b>	<b>457,088</b>			

<sup>1</sup> Report from the Ministry of Environment, Urbanisation and Climate Change on February 16

<sup>2</sup> Preliminary analysis of TURKONFED (Turkish Enterprise and Business Confederation)

- We do not have any comprehensive data on business inventories and other infrastructure in the region. We simply mimic the GDP ratios from the 1999 earthquakes<sup>3</sup> in order to have an upper bound for the potential loss from them. In order to be consistent, we take twice of the corresponding level for infrastructure since the impacted region doubles the area compared to the 1999 quakes. Therefore, by adding the damage on the housing stock, the total loss in the physical capital might reach up to nearly 100bn\$ (11.7% of GDP).
- Secondly, we calculate indirect costs on the value-added whereby we again replicate the capacity assumptions of the World Bank<sup>4</sup> in the 1999 earthquakes. Also we assume one third of the disruptions in the first two quarters are offset by increased activity in other areas. And finally, we multiply net disruption by the weight of the region in the overall output. Consequently, the first two quarters show the most damaged effects, which starts to reverse thereafter and the average direct impact on GDP reaches 1.5-2% of GDP. However, we also need to incorporate the expected significant increase in the fiscal spending. By assuming the same ratio of the fiscal cost to the estimated physical damage in the 1999 earthquakes, we end up with an assumption of near 5.4% GDP fiscal cost, which we expect to reflect a certain share of fiscal expenditures to be spent in a 2-3 years horizon (reaching 3.6% of GDP). Therefore, the net impact from the quakes on the value-added would diminish with the support from fiscal spending, which turns out to be at most 1% of GDP in 2023. Next years, on the other hand, would be positively affected given the lagged impact on GDP, considering the most of the fiscal spending will be in the form of construction investment.

**Table 3: Capacity Assumptions and Estimated Loss on the Value-added**

Capacity assumptions	1Q23	2Q23	3Q23	4Q23	2023 avg.
Adana	80%	80%	85%	92%	84%
Hatay	50%	50%	60%	75%	59%
Kahramanmaraş	50%	50%	60%	75%	59%
Osmaniye	70%	70%	85%	92%	79%
Malatya	57%	60%	70%	92%	70%
Gaziantep	70%	70%	85%	92%	79%
Adıyaman	50%	50%	60%	75%	59%
Kilis	70%	80%	85%	92%	82%
Şanlıurfa	80%	80%	85%	92%	84%
Diyarbakır	80%	80%	85%	92%	84%
<b>BBVA Research</b>	<b>68%</b>	<b>68%</b>	<b>77%</b>	<b>87%</b>	<b>75%</b>
<b>World Bank*</b>	<b>50%</b>	<b>70%</b>	<b>85%</b>	<b>92%</b>	<b>74%</b>

Impact on GDP	1Q23	2Q23	3Q23	4Q23	2023 avg.
Direct	-3.0%	-3.0%	-2.1%	-1.2%	-2.3%
w/ Compensation From Other Regions	-2.0%	-2.0%	-2.1%	-1.2%	-1.8%
<b>w/ Fiscal Support**</b>	<b>-2.0%</b>	<b>-2.0%</b>	<b>-0.5%</b>	<b>0.5%</b>	<b>-1.0%</b>

\*WB assumptions in the assessment of 1999 earthquakes: a) value added lost due to disruptions in industry and services in the most severely affected regions is 50%, 30%, 15% and 8% in the first 4 quarters, b) one third of the disruptions in the first 2 quarters are offset by increased activity in other areas, c) multiplying net disruption by the weight of the region

\*\* Cyclical fiscal multipliers are assumed, 2.2 in one-year, 0.9 in two-year cumulative impact starting from 3Q23

<sup>3</sup> [Economic Effects of the 1999 Turkish Earthquakes: An Interim Report by OECD](#)

<sup>4</sup> Shared as a comparison in the above OECD report

- Finally, we add second round effects on current account balance. The direct impact on exports (including tourism) stemming from the losses in the region might be low, near 5bn\$ (0.6% of GDP). However, we need to add the impact from the expected increase in the public investment. An average 30% imported content of reconstruction will add near 1.1% of GDP current account deficit (10bn\$) in a three-years horizon, 0.5% of which we expect to be seen in the first year (near 4bn\$).

**Table 4: Summary of the Estimated Loss Including Second Round Effects**

	<b>Estimated Cost (% GDP)</b>	<b>Estimated Cost (bn\$)</b>
<b>Direct Costs</b>	<b>11.7%</b>	<b>102</b>
Housing	8.6%	75
Enterprises	1.8%	16
Infrastructure	1.2%	11
<b>Indirect Costs</b>	<b>1.8%</b>	<b>16</b>
Value-added	1.8%	16
<b>Total Damage</b>	<b>13.5%</b>	<b>117</b>
<b>Secondary Effects</b>		
<b>Current Account Losses</b>	<b>1.7%</b>	<b>15</b>
Direct	0.6%	5
Indirect	1.1%	9
<b>Fiscal Costs</b>	<b>5.4%</b>	<b>47</b>

- All in all, we interpret the latest devastating earthquakes will have significant consequences. The maintenance of the current economic framework has become even more challenging because of the need for additional external financing. However, we do not foresee a balance of payments problem at least till the elections by assuming expected pending external support (Saudi & Qatari) and other financial aid will help, including the impact from a better global demand environment.

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