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ECONOMIC BURDEN OF ROAD TRAFFIC ACCIDENTS AND POOR ROAD QUALITY IN UZBEKISTAN

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Abstract

Using the latest available (2019) statistics, the authors develop estimates of the total economic costs of road traffic accidents (RTAs) for the Republic of Uzbekistan, with the analysis conducted at the regional level. The presented analysis relies on the cost-based human capital approach, with an admixture of transferred WTP estimates for the Value of Statistical Life. Our findings of the total economic loss of RTAs in Uzbekistan (about USD 200 mln annually if converted at the nominal exchange rate for sum, or 1.1% of the national GDP)1 place the RTA situation in the country at above-the-average compared to other countries in the low- and middle- income grouping and suggest that most of the accidents are due not so much to road infrastructure failures as the reckless driving culture prevalent among the local drivers. These findings are compared and contrasted with the more widely dispersed incremental annual vehicle operating costs in Uzbekistan associated with the existing road maintenance conditions.

The obtained regional estimates for all the 14 regions of the country can be used for prioritizing regional directions of investment going into road improvement and construction.

Keywords: Road safety, road traffic accidents (RTAs), economic loss from road crashes, road quality

抽象的

作者使用最新的（2019 年）统计数据估算了乌兹别克斯坦共和国道路交通事故 (RTA) 的总经济成本，并在区域层面进行了分析。所呈现的分析依赖于基于成本的人力资本方法，并混合了对统计生命价值的转移支付意愿估计。我们对乌兹别克斯坦区域贸易协定的总经济损失的调查结果（如果按名义汇率换算，每年约为 2 亿美元，或占全国 GDP 的 1.1%）1 使该国的区

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域贸易协定状况高于平均水平其他低收入和中等收入国家，并认为大多数事故的原因与其说是道路基础设施故障，不如说是当地司机中普遍存在的鲁莽驾驶文化。这些发现与乌兹别克斯坦与现有道路维护条件相关的更广泛的年度车辆运营成本增量进行了比较和对比。
获得的全国 14 个地区的区域估计可用于确定区域投资方向，用于道路改善和建设。

关键词：道路安全，道路交通事故（RTA），道路交通事故造成的经济损失，道路质量

Introduction

Improving safety on the roads is both a global and national challenge, and it represents an element of the core UN development priorities. Across the planet, deaths in road traffic accidents (RTAs, car crashes, and pedestrian hits) – in excess of 1.3 mln people globally or 18,2 per 100 000 of the population every year– is the 8th leading cause of death claiming more lives every year than AIDS, with that death toll remaining approximately steady since around the turn of the century. Additionally, RTAs cause nearly 50 million injuries every year (WHO, 2018). Many of these deaths are preventable since the RTA-related death risk remains more than 3 times higher in low-income countries compared to high-income countries (the incidence of RTAs is 27.5/100,000 in low-income countries vs. 8.3/100, 000 in high-income countries)2.

From an economic standpoint, the burden of the RTA-related death toll and injuries is capable of monetization for the purposes of informing policy priorities on physical infrastructure development and road-safety measures. Almost all developed countries and many developing ones conduct such research initiatives on a regular basis to reflect changes in the road safety domain. To give a measure of the scale of the problem in the poorer countries, at one point in time it was estimated that the amount of development aid the LMICs were receiving from developed countries was less than the scale of economic inefficiencies resulting from RTAs occurring on their roads (Shudkam et al, 2017)3. Presently, about 93% of the world's RTA fatalities occur in LMIC countries, even though these countries account for about 60% of the world's vehicle fleet (WHO (2018)).

In Uzbekistan, the situation with road fatalities and injuries has also remained more or less stable since the turn of the century, with the death toll hovering at about 2000 people in annual road-kills, and injuries declining slightly but secularly from 12 to 10 thousand cases. Nonetheless, these data give cause for optimism since they have been recorded against the backdrop of a continuing increase in the incidence of private car ownership, which changed from 42 vehicles per 1000 residents (42/1000) in 2005 to more than 76/1000 vehicles in 2020 (Uzstat (2019))4.

Materials And Methods

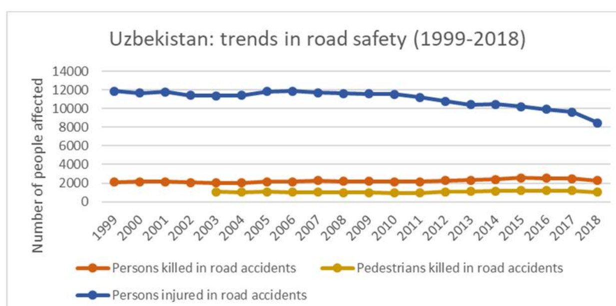

Fig.1 Road fatalities and injuries in Uzbekistan (1999-2018)

In line with the UN Sustainable development goals (SDG) and targets enshrined in the 2030 Agenda for Sustainable Development (UN 2015), Uzbekistan has also adopted a parallel SDG 3.6 to reduce by half the number of RTAs in the country by the year 2025, including those where pedestrians are at fault (Resolution #841)5. This is an ambitious development goal, which requires a multi-faceted analysis of its implementation. This paper is in part motivated by the need to pave the way, on the basis of data publicly available, for a full-scale economic cost-benefit analysis (CBA) for road safety in the Republic of Uzbekistan; as a first step towards this goal we attempt to work out the economic cost-side of road-safety situation in Uzbekistan as per the latest public data available, leaving an inventory of measures and potential benefits from improving the situation for a future exploration.

The approach adopted in this paper follows in the footpath of similar studies (Wijnen & Stipdonk (2016))6; NHTSA (2002); UK DfT (2012)) and attempts to evaluate the actual situation with the social and economic cost of road traffic accidents in Uzbekistan, expressing it as a percentage of the national GDP.

Cost-benefit analysis (CBA) of road safety was pioneered in Britain and then in the US in the middle of the 20th century (Jones-Lee & Spackman (2013))7. Over and above the estimation of direct medical costs, the underlying economic idea is to be able to monetize personal and social damage arising from premature deaths on the roads and the lasting consequences of post-crash morbidities. This is done either under the cost method through estimating the foregone economic benefits from the employment of the deceased and permanently incapacitated (the human capital or friction-cost approaches) or under the elicited value-based techniques, such as the WTP for Quality-adjusted life years (QALY), or the statistical value of human life (VSL)8 (Brent (2014)). While the basis of the cost-based techniques is rather straight-forward in the framework of CBA, contingent survey methods, such as the WPT for QALY, have also found a wide application in the CBA for road safety, especially in the context of surveys of road safety in the developed countries.

Regardless of the techniques used, the estimated aggregate RTA-related damage is then expressed as a percentage of a national (or regional) gross product. One important recent meta-study of the economic toll of RTAs is Wijnen & Stipdonk (2016). The diagram below is borrowed from that source and charts the economic costs of RTAs as a percentage of the respective countries' GDPs – as broken down between the developed (HICs) and developing (LMICs) country groupings.

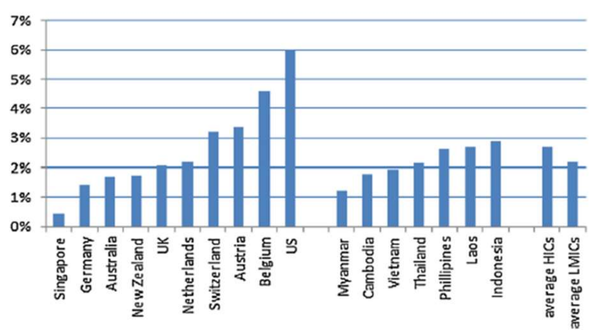

Fig. 1. Costs of road crashes as a percentage of GDP.

Fig 2. Evaluation of social costs from RTAs for low-middle (LMIC) and high income (HIC) countries (as a % of GDP)

It is an observed general regularity that whilst the social cost estimates for RTAs are based on the statistical value of life elicited under the contingent valuation techniques (WTPs) in HICs, the researchers predominantly use cost-based techniques in the context of LMICs (i.e. Cost-of-illness (COI) methods, with the inclusion of direct (medical) costs and indirect costs associated with the foregone economic benefits). Probably partly to this the economic value of statistical life differs significantly between the HICs, where it is typically valued on the order of USD 1 mln and above, and LMICs, where the typical estimates of VSL used vary from the equivalent of tens to a few hundred thousand USD – though substantial cross-country differences in the living costs and marginal products of human capital also account for a material part of the disparity. Therefore, we see from Fig. 2 that in relation to national GDPs the economic costs of RTAs are generally more or less similar as between LMIC and HIC country groupings.

The economic cost of RTAs is essentially a sum of economic costs of RTA-related fatalities and morbidities. Typically, the economic costs of fatalities are made up of foregone market productivity (under the human capital approach), with the costs of unsuccessful treatment accounting for under 5-10% of the total economic cost of fatalities. On the other hand, foregone market productivity and medical costs make an approximately similar contribution to the economic cost of nonfatal injuries9 (NHTSA (2002), UK DfT (2012)).

While in the sphere of RTA-related CBA assessments, there is always a latitude of choice on how to monetize economic loss resulting from the fatalities, the economic loss from RTA-related morbidities is usually based on the cost approach and represents the medical treatment costs incurred both in direct Medicare as well as indirect (such nursing, nourishment, etc.), plus the economic cost of incapacities (invalidities) for those permanently disabled as a result of RTAs. There is a sizeable body of recent empirical research on the medical treatment costs of RTA causalities in both developing and developed country hospitals10 (Manouchehrifar et. al (2014), Papadakaki et al (2016), Wijnen & Stipdonk (2016), Shadkam N., Mahboub-Ahariet A. et al (2017), Amanollahi et al (2019), Banstola et al (2020)). Incidentally, lots of research papers cite RTA treatment cases in Iranian public hospitals, a country quite close in terms of economic development and purchasing power parity (PPP) situation to Uzbekistan. From Papadakaki et al (2016) and Amanollahi et al (2019) it can be inferred that such treatment costs (direct plus indirect) range from USD 1500 to USD 3000 for inpatient RTA cases of average severity (as converted at prevailing nominal exchange rates). Given similarities in dollar PPP for both countries and having regard to the fact that no such RTA treatment cost studies have been heretofore conducted in Uzbekistan, the value transfer method can therefore be adopted with respect to these data. Generally, the medical treatment costs of RTA accidents of moderate to serious severity (MAIS 2 and MAIS 3) stand in 5-10% proportion to VSL estimates, according to USDT (2017)11.

With respect to the societal costs of permanent incapacities resulting from RTAs, the approach frequently adopted is the human capital approach, by which life-time losses in earnings for those affected are statistically estimated and capitalized. Much hinges, of course, on the proportion of permanent disabilities (%D) among surviving RTA victims. Here the specific country policies and approaches to disabilities and disability benefits come into play. For example, Ditsuwan et al (2004) estimate that in Thailand the rate of permanent disabilities among those admitted to hospitals in consequence of RTA cases is 4.6%; on the contrary, a respective study commissioned for Sweden12 (Malm et al (2008)) reports that even among RTA patients with AIS 1 scale of injuries (minor injuries) the rate of permanent disabilities is 10%. In a classical study by Bull (1985) for England, it is found that for inpatient RTA casualties 28% develop some degree of permanent disability, with the proportion of those having a severe disability being 3%. In the light of these data, an estimate for the percentage of permanent disabilities sustained in consequence of RTA injuries on the order of 15-20% seems reasonable for Uzbekistan.

Data from RTA research on the mean age of traffic causality inpatient admissions for the countries with a similar demographic situation as Uzbekistan that we surveyed, e.g. Iran, suggest that this age is in the early 30s (e.g Shadkam et al (2017); whereas for the whole EU the mean age of RTA cases (fatalities only) these days is estimated as closing in on the 50s.13 (EC (2020)).

Estimates of the economic burden of RTAs, especially under the human capital approach, rely heavily on discounting. The usual approach for road transport CBAs is to use a perspective of the social discount rate (e.g. see DTMR (2011), The Green Book (2020)). In developed countries, real social discount rates on the order of 2-4% per annum are often used (Green Book (2020). It is noteworthy that such a magnitude of social discount rates is also consonant with individual rates of time-preference estimated in the WTP surveys for 1 additional QALY of life now and in the future14 (e.g. see SHIROIWA et al (2010)). Therefore, in our analysis, we also opt for the use of real discount rates of similar magnitude, with a slight adjustment for the catching-up effect in the real economic consumption growth for developing countries.

The total economic cost of RTAs occurring in a given year for a region of Uzbekistan is estimated as a sum of current and lasting economic burdens of fatalities and morbidities caused by the RTAs (including foregone income):

$$TC_{RTA} = TCF + TCM \qquad (1)$$

where:

TCF – is a total economic cost of fatalities, expressed in USD at PPP15;

TCM – stands for the total economic cost of permanent morbidities/disabilities in consequence of RTAs, expressed in USD at PPP;

We don't account for the RTA –related property damage – partly due to the fact that such costs are usually close to negligible (on the order of 5-10 percent of the total economic cost (NHTSA (2002), UK DfT (2012)) where they are incorporated into the analysis, and partly due to the fact that the cost of repair of crashed vehicles is counted as a part of market-related (entrepreneurial) economic activities incorporated into the GDP, and is not exactly an external economic cost.

For both costs (TCFs and TCMs), we use real estimates consistently expressed in purchasing-power parity (PPP) dollars (assumed for 2019 to be at 4.91, or 2091 Uzbekistani Sum to USD 1 at PPP, according to Knoema (2020)). For estimation purposes, we project the real economic growth of GDP for Uzbekistan at 3% per annum in continuous average growth, given the proven resilience of the Uzbekistani economy to recent pandemic-related shocks. Therefore, we utilize a baseline real social discount rate of 5% per annum, which is higher than the one suggested for use by the Green Book (2020) in the context of a developed country economy, because of higher expected real economic growth for Uzbekistan. The share of wages/salaries in Uzbekistan GDP (w) has been estimated at 51% of GDP; this estimate is based on 2019 data for the count of domestic economically active population and average per-capita wages in the country, after statistical allowance for underreported self-employment. We assume the nationwide mobility of labor and don't differentiate this estimate by region.

Fatalities

For cross-checking needs, we use a combination of value transfer method for WTP-based estimates of the value of statistical life and the human capital approach to estimate TCFs:

$TCF = ((WTP_{VSL} + PV\ (Foregone\ Economic\ Contribution))/2) * n(f)$ (2)

where:

TCF – is a total economic cost of fatalities, a regional estimate expressed in USD at PPP;

WTPVSL – Value of Statistical Life based on a benefit transfer for WTP estimates (for Uzbekistan we make use of a VSL estimate of USD 400 thousand at PPP in 2019, which is consonant with estimates elicited in neighboring countries (e.g. FUGRF (2018));

PV (Foregone Economic Contribution) – capitalized per capita GDP foregone due to a road fatality. The capitalized foregone contribution is developed under the annuity-with-growth capitalization technique with the capitalization period of 30 years – from the assumed median age of fatalities (30 years), till the national pensionable age of 60 – at 5% real social discount rate and 3% real growth rate, with the current 2019 estimate of GDP per capita being at USD 7,340 at PPP).

n(f) – number of fatalities reported in a region during the survey period (2019)16.

As can be seen from (2), the Value of Statistical Life (VSL) taken for an estimate of the economic costs of fatalities is an arithmetic mean of the applicable WTP-based estimates and capitalized foregone contribution of the deceased to the GDP. In turn, the WTP-based VSL estimate is a transferable value of the same based on the available global estimates (Wijnen W. & Stipdonk H. (2016)). Expressed at PPP, there is no reason to think that in developing countries the VSL estimates adopted should be significantly less than those available from the (predominantly developed country) surveys; otherwise, the inference would have been that developing societies value human life at less and should consistently underinvest in road safety. This is a rebuttable inference given the lack of statistical support for it in the country and the adoption of RTA-related sustainable development goals17 (SDGs) by Uzbekistan.

Morbidities/Disabilities

With respect to morbidities, we account for them by having regard to mean direct and indirect medical treatment costs (estimated under the value transfer method, due to the unavailability of public data for Uzbekistan proper) and additionally incorporating into the analysis the economic cost of foregone employment for the permanently disabled and the cost of their lifetime income support (invalidity allowances) over the period of life expectancy from the mean age of RTA-causalities. Absent any firm data on that, the mean age of the RTA causalities is assumed at 30 years for Uzbekistan.

We use the following formula to estimate the associated economic burden of disabilities:

$TCM = n(i) * MTC + n(i) * \%D * (PV(Allowances) + PV\ (Foregone\ market\ productivity))$ (3)

MTC – average direct and indirect medical treatment costs for inpatient RTA injuries (estimated at USD 10,000 at PPP based on the value transfer methods from the recent Iranian studies (e.g. Shadkam et al (2017), Manouchehrifar M (2014)18);

PV (Allowances) – capitalized (present) value of disability allowances and lifetime support, based on the real treasury discount rate equivalent to the real social discount rate (5%) and the annuity term of 35 years. In Uzbekistan, the system of disability allowances is quite complex, and, for the elderly disabled, state pensions are also paid on top of their disability allowances. Additionally, persons with disabilities are entitled to free medical care. It can be estimated that currently the combined per capita disability benefits plus Medicare costs for the disabled are equivalent to USD 8,500 annual cost at PPP, a figure that can be expected to grow in the future at least per person with the general economic rate of growth (3%);

PV (Foregone market productivity) – is estimated in a similar way as for fatalities, but having regard to the GDP wage fund adjustment, since partially disabled can also contribute to economic activities in some way;

n(i) – number of injuries reported in a region over the survey period (2019).

In the Results section, we provide regional estimates for the total economic cost of RTAs for Uzbekistan in 2019. Such a breakdown in the presentation of the findings is made possible because Uzbekistan has a developed system of statistics for gross regional products (with the latest available reporting being for the full year of 2019. (Uzstat, 2020)) And now also develops RTA casualty statistics on the regional basis.

Results And Discussion

Our findings on the total economic cost of RTAs are presented separately for each region of the Republic of Uzbekistan in Table 1. It appears that the economic burden of RTAs for the country as a whole is slightly above USD 1 bln at PPP annually (or about US 200 mln if converted to USD at the prevailing market exchange rates). This estimate is under 1.2% of the national GDP, which can be benchmarked as a better than the average situation compared to other LMIC countries globally 19(see Fig. 2). The accuracy of our assessments evidenced by the imputation of other plausible alternative scenarios for the monetization of RTA damages can be estimated at +/-0.5% of the obtained relative GDP estimates20. However, there is no cause for complacency as further increase in the incidence of private car ownership, absent any investments into the road safety infrastructure, can upset the current road safety situation very rapidly.

The regional scatter of RTA's impacts is also pronounced. The worst impacted regions in terms of RTA loss in relation to their gross regional products are Jizzakh (2.2%), Namangan (1.8%) and Samarkand (1.6%), while Navoi region (0.4%), Bukhara region (0.7%), and, inter alia, Tashkent city (0.8%), with the economic cost of road accidents of almost USD 150 mln at PPP nominally, appear to be the least affected regions on the same basis of comparison to the regional economic product (GRP)21. For the rest of the country's regions, the scatter of RTA-related economic damages is concentrated in the range of 1-1.6% in relation to their respective GRPs.

Table 1. Economic Cost of Road Traffic Accidents, by regions of Uzbekistan (2019)22

Region	RTA Deaths*	RTA Injuries*	VSL, averrage of WTP and human capital cost, USD at PPP	Total economic cost of fatalities, USD mln at PPP	Total treatment cost, USD mln at PPP	Human capital loss due to permanent incapacities, USD mln at PPP	Life time cost of benefits and medicare due to road injuries, USD mln at PPP	Total economic cost of injuries, USD mln at PPP	Total economic cost: injuries + fatalities, USD mln at PPP	Total economic cost: injuries+ fatalities, % of regional GDP (TEC/GDP)	Ratio of economic costs of fatalities to the total economic costs (fatalities+ injuries), %
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (5)+(6)+(7)	(9) = (4)+(8)	(10)	(11) = (4)/(9)
Karakalpakstan	93	234	280 403	26,1	2,3	4,8	12,2	19,3	45,4	1,2%	0,57
Andijan	114	554	280 403	32,0	5,5	11,4	28,8	45,7	77,7	1,2%	0,41
Bukhara	69	241	280 403	19,3	2,4	4,9	12,5	19,9	39,2	0,7%	0,49
Fergana	188	793	280 403	52,7	7,9	16,3	41,3	65,5	118,2	1,6%	0,45
Jizzakh	114	353	280 403	32,0	3,5	7,2	18,4	29,1	61,1	2,2%	0,52
Kashkadarya	185	629	280 403	51,9	6,3	12,9	32,7	51,9	103,8	1,5%	0,50
Khorezm	62	131	280 403	17,4	1,3	2,7	6,8	10,8	28,2	0,8%	0,62
Namangan	113	570	280 403	31,7	5,7	11,7	29,7	47,1	78,7	1,8%	0,40

Navoi	70	165	280 403	19,6	1,7	3,4	8,6	13,6	33,3	0,4%	0,59
Samarkand	243	561	280 403	68,1	5,6	11,5	29,2	46,3	114,5	1,6%	0,60
Sirdarya	39	170	280 403	10,9	1,7	3,5	8,9	14,0	25,0	1,1%	0,44
Surkhandarya	99	263	280 403	27,8	2,6	5,4	13,7	21,7	49,5	1,0%	0,56
Tashkent	229	636	280 403	64,2	6,4	13,0	33,1	52,5	116,7	1,1%	0,55
Tashkent City	116	1366	280 403	32,5	13,7	28,0	71,1	112,8	145,3	0,8%	0,22
Total	**1734**	**6666**	**280 403**	**486,2**	**66,7**	**136,7**	**347,0**	**550,4**	**1036,6**	**1,1%**	**0,47**

Note: *Uzbekistan RTA statistics records only injuries requiring an inpatient treatment, RTA related deaths are also recorded at a point of incident.

The structure of RTA-related economic damage is also noteworthy. Fatalities account for about the same share of the total economic costs as injuries (40-60%) in almost all regions, with the exception of Tashkent city, where the respective contribution of fatalities to the total economic damage from RTAs is under 25% against the background of twice higher car ownership rate than the national average 23(162 vs. 76 registered cars per 1,000 population in 2019). This is consistent with the international findings that the contribution of fatalities to the total economic costs of RTAs tends to be less for counties/regions with a higher level of economic development (Wijnen & Stipdonk (2016)).

Table 2. Correlation between Total economic costs of RTAs (TEC/GDP ratio) and select RTA statistics, by region.

Pearson correlation coefficient	**Length of cement and asphalt roadways**	**Deaths (D) + Injuries (I)**	**Accidents (A)**	**(D + I) / A**	**Car ownership per 1,000 of population**
TEC/regional GDP	0,38	0,23	0,29	0,08	-0,50

Even though infrastructure and the quality of roads are immensely important for the development of the economy, our study shows that they have little or no impact on the number of accidents. The main reason seems to be a culture of driving and drivers' behavior. The modern road-safety technologies might include concrete medians that prevent head-on crashes and provide pedestrians a small safe zone while crossing roads. Roundabout, road humps, pedestrian bridges, lanes markings, and road signs are among other effective measures. Nevertheless, the most efficient measure to influence driver's behavior is considered to be high-tech digital cameras.

Apart from the estimated economic cost burden from accident-causing driving habits and road-quality in the country, incremental vehicle operating and maintenance costs arising from sub-standard and unimproved roads represent an additional factor in the balance of economic costs from poor roads. Unlike the impact of road crushes, the impact of incremental vehicle operating costs is widely dispersed across the economy and is less keenly felt, but is no less prominent on this account in absolute terms. Sodikov (2018)24 estimates the annual savings in vehicle operating costs achievable for Uzbekistan under three alternative scenarios: first, when the road pavement roughness is IRI = 3 m/ km, that is, a satisfactory condition; the second when the roughness is IRI = 5 m / km that is, unsatisfactory condition; and the third is when the pavement roughness is IRI = 7 m / km, that is, the worst condition. For each such road condition, vehicle operating costs were estimated by reference to the Development World Bank Road and Management Systems tool (HDM4 (2019)25). The results show that with an increase in pavement roughness from IRI = 3 m / km to IRI = 5 m / km (first scenario), vehicle operating costs increase by 3% - 9%, depending on the type of vehicle, and with an increase in pavement roughness from IRI = 3 m / km to IRI = 7 m / km (second scenario), those costs tend to increase by 4% to 17%26. In the context of overall vehicle fleet in Uzbekistan these relative estimates translate to USD 6.6 billion in absolute terms under the first scenario and to 7.2 and 7.7 billion US dollars under the second scenario27. That is, if the roads are maintained in satisfactory condition (IRI = 3 m / km), an annual saving of USD 500 million can be achieved in comparison to the second scenario; and in comparison with the third scenario, one can achieve a saving of USD 1.1 billion per year28. (Sodikov, 2018). These estimates are therefore comparable in terms of their orders of magnitude with the annual economic cost of RTAs estimated in this paper and come on top of the latter, thus representing a second largest element in the balance of economic costs from the unimproved road condition in Uzbekistan.

Conclusion

Our estimates can serve as preliminary determinations of the total economic costs of road accidents in Uzbekistan – to help inform regional priorities for road improvement measures, given the regional breakdown provided. Achieving SDG Objective 3.6 from Uzbekistan Resolution # 841 to halve the number of RTAs in the country in 5 years will also imply a reduction in the respective economic losses being reported by approximately half (assuming the preservation of ratios between fatalities and casualties, as well as property damage only (PDO) accidents). This means that one-off investments into road improvement measures relating to existing roads helping achieve this outcome will pay off economically provided their costs don't exceed a certain multiple (say, 20 years' purchase, or approx. USD 20 bln at PPP nationwide) of the annual economic damage in fatalities and causalities they would help avert. In practical terms and on average for the country's regions, this would mean that road improving investment projects worth even 10%

of regional GDP can be generally supported by the estimates obtained in this paper.

Our overall analysis shows that economic losses from RTAs and poor quality of roads have significant negative impact on the economy and approximate 1.5-2% of GDP. Therefore there is an acute need to support national strategy on road development and traffic safety measures in Uzbekistan with more elaborate CBA analytical efforts than were previously in evidence.

Conflict Of Interests And Contribution Of Authors

The authors declare the absence of obvious and potential conflicts of interest related to the publication of this article and report on the contribution of each author.

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