International Conference of
Economics, Finance and Accounting Studies

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Air Unfair: Constructing A Causal Chain of Factors Affecting Air Quality in Cities, Like Tashkent

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ABSTRACT
Serious health risks and environmental issues are brought on by air pollution, particularly in urban areas. The air quality in urban areas like Tashkent is gradually deteriorating, primarily because of elevated levels of particle matter (PM). Understanding the causal relationships between the several contributing factors is necessary for creating effective solutions. This paper uses a Directed Acyclic Graph (DAG) technique to construct a causal chain that elucidates these linkages.

Introduction

In particular, Tashkent, Uzbekistan, is the subject of this thesis' investigation of the complex causative factors affecting air quality in urban environments. We determine and examine the connections between environmental, social, and economic aspects influencing particulate matter (PM) levels in the air by utilizing a Directed Acyclic Graph (DAG) methodology. In order to improve urban living conditions and guide policy decisions, this research attempts to provide a thorough understanding of the dynamics governing air quality.

What are the causal chains of factors affecting air quality in cities like Tashkent, as measured in particulate matter?

At present, one of the most pressing environmental problems is air pollution. The sources of air pollution in the city are exhaust emissions, dust from road surfaces, public and household pollution, dry climates, and improper use of soil. Therefore, the major pollutants in the air include nitrogen oxides, hydrocarbons, suspended substances, carbon monoxide, and sulfur oxides. Carbon monoxide, nitrogen dioxide, and sulfur dioxide are pollutants that pose important health risks for urban residents. In this paper, four principal air pollutants: nitrogen oxides, carbon monoxide, nitrogen dioxide, and particulate matter (less than 10 micrometers in diameter) will be considered. The frequency of construction and exploitation of construction complexes in modern cities requires more frequent solutions to problems related to atmospheric air pollution and the reduction of the hazardous impact on the environment.

The rise in air pollution that has occurred since the 1980s has been the subject of heated discussions in recent years. By comparing the hypotheses step-by-step and avoiding sweeping causal generalizations, we may be able to arrive at a more accurate understanding of air quality trends. A variety of ways will be proposed in which the national increase in the number of cars with relatively old and poorly tuned engines could have counteracted the race to reduce auto emissions. These include modifications to the cost structures for motor fuels or adjustments to the financial circumstances of automobile owners.

Air pollution presents serious health hazards as well as environmental problems, especially in urban areas. The quality of the air in cities such as Tashkent is progressively declining, mostly due to high particulate matter (PM) levels[1]. Designing successful interventions requires an understanding of the causal linkages between the many contributing components. This work builds a causal chain that clarifies these linkages using a Directed Acyclic Graph (DAG) technique. DAGs are pictures that encode the analyst's qualitative causal ("structural") assumptions about the data generating process (DGP), specifically, which variables cause what other variables. "DAGs are pictures of how the world works."[2]

Concomitant meteorological parameters such as adverse topography in some urban areas, temperatures are up to 10-15°C higher than those in nearby rural areas due to less dense building, less concrete, and, if lucky, a park, are another factor to be considered. Of course, there are many more factors to be reviewed, including how the different pollutants get generated in the first place. Similarly, as there are many unique sources associated with the air pollution in the Central Asian cities, there will be non-unique solutions to any problems identified within this research study. Finally, all of the impacts of air pollution are not seen on a "single plot," or in our case observed in a "single city." Travel and trade are bringing cities ever so close to one another, meaning that what happens in one city will eventually affect many others. Therefore, the study team decided to take on predictions early in the research design phase of what the authorities, and more importantly, the residents of the city will have to do in order to stop their dirty air from being spread to other communities. We hope to create a system of policy recommendations to deal with the problem of increasing air pollution in Central Asian cities. So, the preliminary task was to attempt a compilation of the list of the major driving forces governing urban air pollution, the preliminary results of which are the object of this article.

Tashkent and its surroundings often reach the top of the most polluted places lists. Getting rid of pollutants is difficult and costly. To act smart, decision makers need to know how air pollution is produced in the first place. This text constructs a cause-and-effect chain which explains the path from the behaviours that we can observe, through economic, social, and political decisions to environmental effects, like air pollution. It shows the advantages of existing research and helps to fill the existing gap in our understanding of the rise of dirty cities. This is a research plan, unearthing the parts of puzzle. No data has been collected yet, therefore complex data analyses are going to be done in the future.

The air is mostly composed of nitrogen and oxygen, and around 1% of it contains inert gases. However, when people are talking about "bad air", they think of pollutants, substances that can directly or indirectly harm people and animals. Main threats to human health come from small particles, sulphur dioxide, nitrogen dioxide, ground level ozone and carbon monoxide. In the cities trace amounts of many other pollutants can also be found. We had better distinguish the concepts of air pollution and air quality. Air quality is measured as being good, fair or poor. Such measures usually ignore the so called "background concentration" of the substances, assuming it is not a raiser of health concerns. Behind the colour ranges hide legal limits that at the national and European level are becoming progressively wider. While better air quality is not always a bad thing, it is certainly true that achieving goals require investments of time and resources.

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