

DOI: 10.5281/zenodo.113225105

SYSTEMATIC REVIEW ON THE IMPACT OF PUBLIC POLICIES ON OCCUPATIONAL HEALTH: QUANTITATIVE EVIDENCE FROM ECONOMETRIC STUDIES

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Received: 27/05/2025
Accepted: 27/08/2025

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ABSTRACT

Occupational health is a key factor in sustainable development, and public policies play a decisive role in shaping workers' safety and well-being. This study analyses the causal impact of public policies on occupational health using quantitative evidence from econometric research. A systematic literature review was conducted following the PRISMA 2020 protocol, with searches in Scopus and Dimensions.ai. After applying thematic, temporal, and methodological filters, 26 primary studies were included, 8 from Scopus and 18 from Dimensions.ai. The studies employed diverse approaches, including regression models, Difference-in-Differences (DiD), Propensity Score Matching (PSM), Regression Discontinuity Designs (RDD), and Instrumental Variables (IV/2SLS). Evidence shows that well-structured policies, such as occupational safety standards and health management systems, improve employee well-being and reduce accident rates, while austerity or poorly regulated measures can worsen occupational risks. The effectiveness of public policies on occupational health depends on methodological rigor, institutional support, and contextual conditions, highlighting the importance of robust econometric designs to inform evidence-based decision-making.

KEYWORDS: Occupational Health, Public Policy, Econometrics, Risk Prevention, Workplace Well-being.

1. INTRODUCTION

In areas relevant to the modern world, such as climate change, the analysis and study of data that corroborate the magnitude of the problem has helped us better understand the damage and causes of the problem, as well as determine and observe the various consequences for the environment. Using specific metrics, numerical data has been compiled to support accurate information, which focuses on key areas of society, such as the economy (Pinto Molina & Granja Altamirano, 2023).

Economics, for its part, has been responsible for clearly demonstrating the consequences of climate change, through its influence on trade, production and the market for products, as well as key services in the global environment. Econometrics, on the other hand, refers to the implementation of statistical and mathematical techniques in the analysis of economic data to confirm economic theories or related facts, presenting itself as a tool that allows specific changes to be observed without the limitations of traditional descriptive approaches. Regarding its relevance to the consequences of climate change, the analysis carried out by the Sustainable Development and Human Settlements Division of ECLAC (Economic Commission for Latin America and the Caribbean) describes the use of econometric methods linked to climate change to determine the effect of these methods on economic activity, energy demand, the potential for mitigation in international energy prices, and the effects of temperature increases in the reduction and increase of water resources on agricultural yields (Alatorre & Reyes, 2011).

Therefore, a fundamental component of a country's economic development, and essentially of the global economic model, is labor, or the workforce, which sustains local industrial and production areas. Important elements such as occupational health are of particular interest, as health is one of people's basic rights and, in the workplace, is a fundamental component of sustainable economic development and social well-being. Considering the health factor present in the workplace, public policies are emerging aimed at protecting and promoting occupational health, highlighting aspects such as the physical environment that influences performance, as well as the development of regulatory frameworks, prevention strategies, and care programs (Sierra Gómez, 2022).

Therefore, public policies based on the protection and promotion of workers' health have an important place on the administrative agenda of any political organization, especially those whose agenda focuses

on sustainable development (Galindo Salazar, 2025). However, these policies must be supported by data that guarantee their effectiveness and social justification, either through field analysis or statistical evaluations. This is what this study seeks to apply, focusing on the econometric evaluation of these occupational health policies, particularly based on the study of the economy positively or negatively affected by them.

On the other hand, the impact of a factor is based on the investigation of its causes, whether in an applied program, a public policy, or a project. These causes must be supported by a series of interesting results. The evaluation of this impact, as mentioned (García Sánchez & Cardozo Brum, 2017), when undertaken by responsible and specialized institutions such as state institutions, the nature of the results lies in the use of quantitative models to obtain them; where, in exceptional cases where an experimental approach has not been possible, the "second best" theory has been used, which is characterized by the quasi-experimental approach and the complementation of qualitative methods to delve deeper into the explanation of the results. Although the method used under this theory is limited to attempting to measure the impact in a cause-and-effect relationship, the authors' document shows that there is no single concept of impact, since the approaches range from the theoretical to the indisputable with numerical data.

In relation to public policies, impact evaluation focuses on the development of solid methodological designs with internal and external validity of the results obtained, such as: estimation methods, differences in differences, propensity score matching (PSM), and Regression Discontinuity (RDD) models (García Pérez, 2013). On the one hand, PSM serves as a statistical tool with the purpose of reducing the percentage of bias in the selection of studies, specifically in those of an observational research style. And, RDD models refer to a comparative analysis between variables (independent and continuous dependent).

Regarding occupational health, by establishing the key dimensions that define and characterize it, it is possible to identify the indicators that allow for the measurement and relevance of the data obtained through econometric evaluation, highlighting the relationship between the initial hypothesis proposed and the theory of change in the public policies analyzed. Likewise, econometrics, through the use of statistical models with observational data, is capable of determining causal relationships between certain events, such as government intervention, and

changes in certain health indicators, such as accident rates, occupational diseases, absenteeism, and working life in the professional field.

Given this context, this study seeks to understand and determine the impact of public policies through the use of techniques within the framework of econometric evaluation. In addition, policies that include important topics viewed from a more qualitative perspective, such as occupational risk prevention and the promotion of favorable environments for the industrial workforce, and from a more econometric or quantitative perspective, the percentage increase or reduction in occupational accidents or illnesses, are also examined (Ilbay, 2025).

2. METHODOLOGY

The methodological design of this study is based on the Systematic Literature Review (SLR) approach, which ensures transparency and reproducibility in the process of identifying, selecting, and synthesizing relevant evidence. The focus was on research addressing the causal impact of public policies on occupational health outcomes, with emphasis on econometric and statistical methods used in evaluation studies.

2.1. Research Design

The review adopted a qualitative synthesis supported by quantitative descriptors. The research questions were oriented toward: (i) identifying the types of public policies with measurable effects on occupational health indicators; (ii) mapping the econometric methods most frequently used to estimate causal effects; and (iii) synthesizing the magnitude and direction of reported impacts.

The search and selection process followed the PRISMA 2020 guidelines. Three key phases structured the review: identification, screening, and inclusion. Articles were included if they (a) were published between 2011 and 2025, (b) were peer-reviewed scientific articles, (c) focused on occupational health, labor safety, or public policy interventions, and (d) applied or discussed econometric/statistical methods for causal inference. Exclusion criteria comprised incomplete articles, duplicates, and documents without methodological rigor (e.g., opinion essays).

In line with previous methodological recommendations for policy evaluation (Organización para la Cooperación y el Desarrollo Económicos, 2004) and systematic review processes in applied social sciences (van Dinter, Tekinerdogan, & Catal, 2021), this design emphasized the need to integrate econometric perspectives with thematic

qualitative synthesis.

In line with the guiding principles of the review, the specific research questions that structured the selection and synthesis of evidence are summarized in Table 1. These questions ensure that the review maintains coherence and directly addresses the central objectives of the study.

Table 1: Search Questions.

No.	Ask	Aim
1	What types of public policies show statistically significant effects on occupational health indicators in econometric studies?	Identify the various public policies with significant effects on preventing events such as workplace accidents, occupational diseases, and health-related absenteeism.
2	What are the most widely used econometric methods for estimating the causal impact of public policies on occupational health, and what advantages or limitations do they present in each study?	Describe and compare the econometric methods applied in RSL documents, such as instrumental variables, RDD, or panel data, which allow for the observation of distinctive methodological processes.
3	What is the magnitude and direction of the impact of public policies on the main occupational health indicators reported in the quantitative scientific literature?	Establish common patterns and relevant trends based on the documentary analysis of the selected studies, which take impact coefficients, confidence intervals, and levels of interest as reference.

2.2. Databases and Data Sources

Two main repositories were consulted

- Scopus, selected for its coverage of indexed, peer-reviewed studies with high methodological rigor.
- Dimensions.ai, included as a complementary repository to capture recent and regionally relevant contributions.

The search string was

("public policy" OR "government policy" OR "policy intervention" OR "social policy" OR "regulation") AND ("occupational health" OR "labor health" OR "workplace safety" OR "employee health" OR "occupational safety") AND ("impact" OR "evaluation" OR "effect" OR "outcome" OR "assessment") AND ("quantitative" OR "statistical"

OR “econometric” OR “data analysis” OR “panel data” OR “survey”).

The initial search identified 132 records in Scopus and 210 in Dimensions.ai. After removing duplicates and applying filters (timeframe, type of publication, access type, language, and methodological fit), 26 studies were retained: 8 from Scopus and 18 from Dimensions.ai.

The set of studies that met all eligibility criteria and were finally included in the review is presented in Table 2. This table details the main characteristics of each study, the type of data used, and the econometric or statistical methods reported, providing transparency and traceability in the selection process. To strengthen methodological transparency, the overall selection process is

summarized in Figure 1, which presents the PRISMA flow diagram showing the stages of identification, screening, eligibility, and final inclusion of the 26 studies. The initial search yielded 342 records (132 from Scopus and 210 from Dimensions.ai). After removing 104 duplicates, 238 records remained for screening. From these, 176 were excluded for not meeting eligibility criteria (e.g., non-empirical studies, incomplete records, or lacking econometric/statistical analysis). A total of 62 full-text articles were then assessed for eligibility, of which 36 were excluded due to language restrictions, limited access, or absence of relevant econometric design. Consequently, 26 studies were included in the systematic review (8 from Scopus and 18 from Dimensions.ai), as detailed in Table 2.

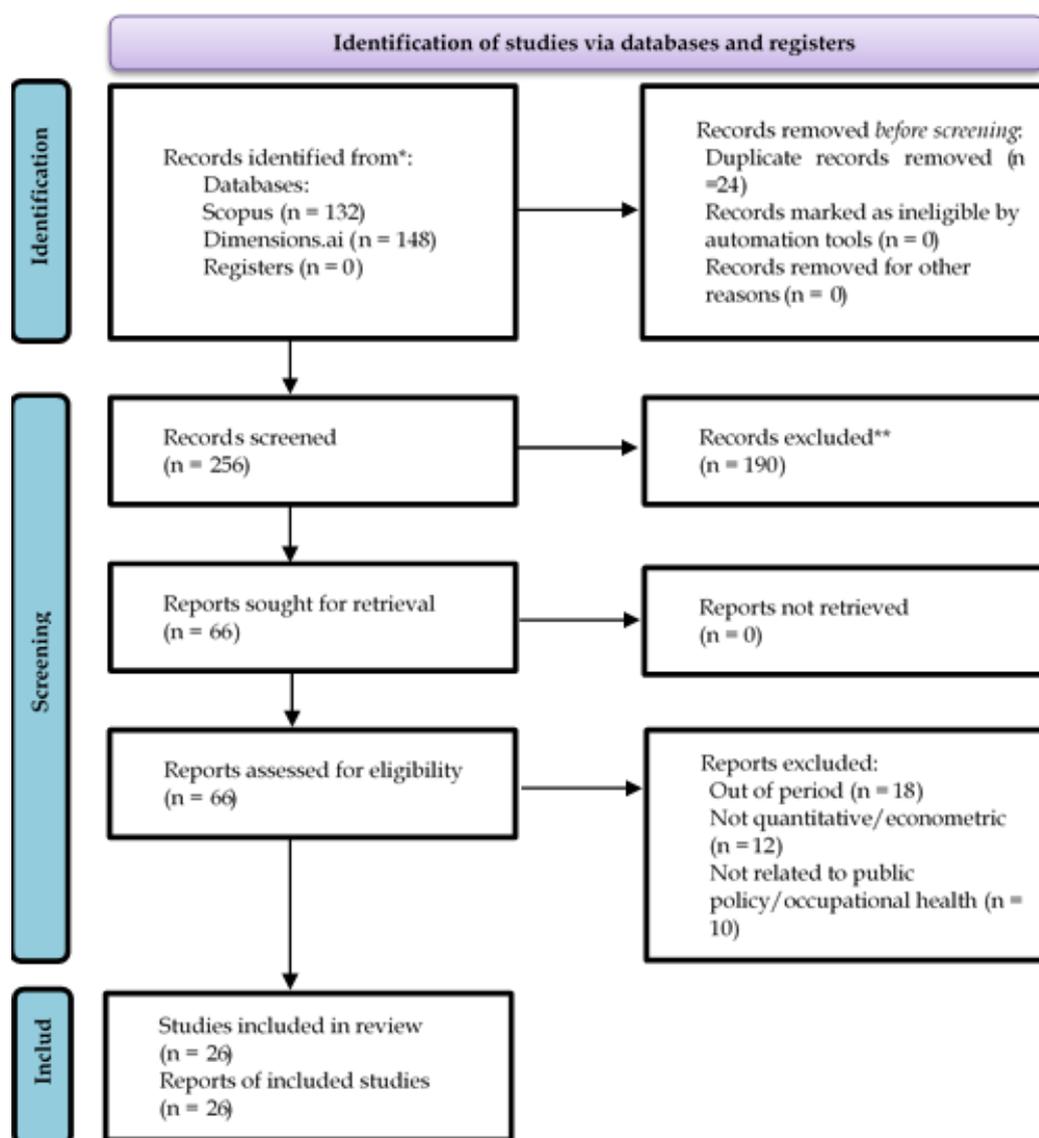


Figure 1: PRISMA 2020 Flow Diagram of Study Selection.

Table 2: Primary Studies Included in the Review (n = 26), with Econometric/statistical Method Reported.

No.	Year	Authors	Title / Journal	Data / Design	Econometric / Statistical Method
Section A Scopus (n = 8)					
1	2024	Senerth et al.	Development of a framework to structure decision-making in environmental and occupational health (Environment International)	Systematic review + Delphi	Non-econometric (systematic review + Delphi)
2	2024	Erhel, Guergoat-Larivière & Mofakhami	Flexible working time arrangements and workers' health (Social Science & Medicine)	Worker panel data, linked employer-employee	Panel data (fixed effects regression)
3	2024	Alegre Quintana et al.	Instrument to measure worker participation in Occupational Health and Safety Management Systems (OHSMS) (Arch. Prev. Riesgos Laborales)	Instrument design / validation	Psychometric validation (non-econometric)
4	2024	Potter et al.	National Policy Index (NPI) and Psychosocial Safety Climate (PSC) (Safety Science)	Cross-national policy index + enterprise data	Multilevel regression models
5	2024	Collier, Halvorsen & Fortuna	Workplace fairness in mental healthcare workers (Workplace Health & Safety)	National survey	Multiple regression / logistic
6	2023	Debela et al.	OHS practices in Ethiopian sugar industries (BMJ Open)	Mixed-methods survey	Multivariable logistic regression (AOR)
7	2022	Niebuhr et al.	Working from home: health & satisfaction (IJERPH)	Cross-sectional survey	Multiple linear regression
8	2022	Kang et al.	Fatal accidents in multi-process workplaces (IJERPH)	Case-based analysis	Descriptive / epidemiological
Section B Dimensions.ai (n = 18)					
9	2011	Alatorre & Reyes	Métodos y técnicas del análisis del cambio climático	Conceptual / methodological	Comparative policy analysis (non-econometric)
10	2018	Alonso-Coello et al.	Marcos GRADE Evidence to Decision (EtD) (Gaceta Sanitaria)	Framework development	Non-econometric (GRADE framework)
11	2016	Cantarero Prieto & Oliva Moreno	Economía de la salud (Rev. Evaluación de Programas y Políticas Públicas)	Literature / applied policy	Cost-effectiveness & economic evaluation
12	2025	Galindo Salazar	Competency-based management and productivity (Nexus Research Journal)	Municipal case, Peru	Multiple regression
13	2025	Garcés Torres et al.	Innovation in denim design methodologies (Ethos Scientific Journal)	Case study - Pelileo, Ecuador	Qualitative textual analysis (non-econometric)
14	2013	García Pérez	Effectiveness of active labor policies in Romania	Policy evaluation design	Impact evaluation design (DiD proposal)
15	2017	García Sánchez & Cardozo Brum	Evaluación de impacto: más allá de la experimentación (Política y Cultura)	Review / conceptual	Quasi-experimental approaches (DiD, PSM)
16	2025	Hernández Pullido & Maheca Fontecha	Educación socioemocional & conflict resolution (Bastcorp Int. Journal)	Case-based educational study	Non-econometric (qualitative)
17	2025	Ilbay	Economía violeta & female entrepreneurship (Horizon Int. Journal)	Survey of entrepreneurs	Logistic regression
18	2018	ISO	ISO 45001 Occupational Health & Safety Standard	Standard / normative	Non-econometric (standards)
19	2025	Intriago Pincay et al.	Risk management in civil works (Rev. Ingenio Global)	Discourse-textual analysis	Qualitative content analysis
20	2024	Meneses Luna	Technology and adolescent sleep patterns (Alpha Int. Journal)	Survey study	Regression analysis

21	2018	Organización Panamericana de la Salud	Indicadores de salud: aspectos conceptuales y operativos	Technical manual	Non-econometric
22	2020	Payá Castiblanque	OHS in Mediterranean labor relations (Aposta Rev. Ciencias Sociales)	Comparative analysis	Descriptive statistics + comparative policy
23	2023	Pinto Molina & Granja	Economic impact of AI & automation (Rev. Científica Kosmos)	Policy/economy article	Econometric modelling (regression)
24	2025	Reyes Allpoc & Ceferino Eguizábal	Gender violence prevention plan (Ethos Scientific Journal)	Program evaluation, Lima (Peru)	Quasi-experimental (PSM, DiD elements)
25	2022	Sierra Gómez	Public policies and elderly quality of life (FLACSO)	Case study, Colombia	Descriptive analysis
26	2024	Tarayca & Anciénaga	OHS management indicators (South Florida Journal of Development)	Organizational survey	Regression analysis

2.3. Data Synthesis and Collection

Data synthesis complements the previous selection of primary and secondary sources, including search criteria, by providing a detailed description of the information available in these sources, establishing an academic data collection consistent with the SLR structure. This collection was carried out using the following research techniques: selection of primary and secondary studies, extraction of key information, thematic organization by research questions, comparative and narrative analysis, and the use of summary tables.

Data collection served as a translation tool for the data synthesis, allowing the synthesized information to be described and the results of the academic articles reviewed for this document to be highlighted.

3. RESULTS

The methodological section describes the questions that shape this research. These questions are answered in this section, which seeks to understand and respond to each question, presenting a distinctive approach. The first question addresses what has been done regarding specific policies; the second question focuses on a critical-methodological approach; and the third question addresses how much and where, allowing for the construction of consolidated empirical evidence on public policies implemented in the area of occupational health.

Answer Question 1: What types of public policies show statistically significant effects on occupational health indicators in econometric studies?

A vitally important aspect for the implementation

of public policies on occupational health indicators is knowledge about the causes that can harm workers' health. This framework can be used to apply a decision-making framework and, through its application, determine the causes of certain occupational health indicators. An example of this is the research by (Senerth et al., 2024), which uses a modified health-based decision-making framework in the field of occupational health, with the aim of adapting and extending the GRADE Evidence-to-Decision (EtD) approach to environmental and occupational health.

On the one hand, the EtD A framework refers to a structured guide that helps expert panels make complex decisions related to clinical recommendations, whether in the public or private health system, as well as health coverage decisions (i.e., insurance), all in a more transparent and orderly manner (Alonso-Coello et al., 2018). As explained above, research on the modification and application of this decision-making framework in occupational health provides some key points for better understanding the functioning of certain health indicators, such as those related to regulatory decisions, the justification of interventions and regulations, and standardized procedures for various occupational risks.

Consequently, occupational health indicators are quantitative assessment and measurement tools that are characterized by their usefulness in identifying problems, advancing health and safety objectives, and detecting occupational hazards (Intriago Pincay et al., 2025). Some of these are shown in Table 3.

Table 3: Occupational Health Indicators.

Guy	Indicator	Description	Exemplification
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Structural	Existence of services	It allows for the observation of the number of companies, organizations, and institutions that provide occupational health services, including those providing risk prevention and services.	In a corporate sector, out of 100 companies, half offer healthcare services. The indicator would be 50%.
	Number of specialist doctors	It allows us to determine the number of professionals trained in occupational medicine to serve the workforce. The indicator is expressed as per 1,000 workers or per 100,000.	A manufacturing company has a population of 30,000 workers and 15 physicians available. The indicator would provide the figure for 1,000 workers, meaning: 0.5 physicians per 1,000 workers.
	Percentage of work centers in relevant areas	Whether in the area of occupational health or safety, it allows us to estimate the number of groups or committees made up of corporate members such as workers and employers.	In a corporate area, there are 100 companies, of which 85 have occupational health and safety committees. The indicator is 85%.
	Risk assessment tools	It allows you to find out the availability of devices and technology intended for the control and prevention of occupational risks.	In a study of 100 manufacturing companies, only 70 had the necessary equipment for risk control and prevention, such as gas meters and lux meters. This represents a 70% indicator.
Impact	Workplace accident rate	It allows us to assess whether preventive actions have reduced workplace accidents over a long period of years. The indicator is based on: per 1,000 or 100,000 workers.	As an indicator of positive impact, in one industry, the rate of workplace accidents occurring during the years 2020 to 2025 decreased from 15 to 7 per 1,000 workers.
	Prevalence of occupational diseases	It allows us to measure whether medical surveillance and risk control programs have reduced the number of work-related illnesses.	As an indicator of the effectiveness of dust and exposure control policies, a mining company details the prevalence of diseases such as silicosis in the workplace, as well as its decrease from 8% to 3% from 2018 to 2024.
	Occupational mortality rate	It allows for the evaluation of the reduction in deaths from accidents or illnesses occurring in the workplace. Based on annual time periods and per 1,000 or per 100,000 workers.	In the construction sector, state audits showed a decrease in annual deaths from 2015 to 2025, with the rate of deaths per 100,000 workers decreasing by 5 to 1.
	Quality of working life	It allows us to measure workers' perceptions regarding security, personal relationships, satisfaction, and work-life balance within a company or institution.	As an indicator of the impact on organizational culture, a company conducts an annual survey on overall workplace satisfaction among its employees, showing an increase from 60% to 85% between 2019 and 2025.
Economic	Cost of lost days	It measures the net monetary amount invested by organizations or social health systems in compensation, public health care, pensions, among other things. This is primarily due to illnesses and accidents occurring during the workday.	An annual review is conducted in a factory to calculate the value of money lost due to work-related accidents and occupational diseases during the year 2024, with a total net expense of \$250,000.
	Average expenditure on occupational risk insurance	It allows you to calculate the value of investments made by a company in insurance premiums and social security contributions for each employee during the year.	A company pays \$120 annually for each worker affiliated with the institutional social security system.
	Loss of productivity	It allows us to reflect the percentage of efficiency lost in the production process due to health problems, decreased capacity, and sick leave.	A manufacturing company estimates that work-related accidents will result in a loss corresponding to 2% of its annual production in 2023. The 2% indicator serves as a basis for estimating the impact on sales and profits.
	Cost-benefit ratio	It allows for comparing the costs of integrating occupational risk prevention programs with the amount of savings achieved through the reduction of accidents and illnesses during the workday.	A metalworking company invested \$100,000 in occupational risk prevention programs, reducing its work-related accident costs to \$300,000. Therefore, the cost-benefit ratio shows a 1:3 ratio, meaning that for every \$1 spent, \$3 are saved.

Note. Constructed based on information available at (Organización Panamericana de la Salud, 2018) and in (Tarcaya & Anciénaga, 2024).

There are other indicators, such as process, outcome, and psychosocial indicators, which are characterized by being used for other types of tabulations or theoretical quantitative considerations, and not as technical as those for econometric studies. Despite the fact that they are linked to the indicators shown in the table, the impact

indicators depend on what the process and outcome indicators allow us to observe; and the psychosocial indicators influence what the economic indicators indicate (Reyes Allpoc & Ceferino Eguizábal, 2025).

On the other hand, there are certain public policies, or rather, regulations that promote certain types of behavior within company personnel, leading

companies to improve their workplaces with employee-promoted safety and health. As mentioned in a study conducted in Peru by the authors (Alegre Quintana et al., 2024), focusing on Occupational Health and Safety Management Systems (OHSMS), the certainty that worker participation in occupational risk prevention shows a decrease in the rates or indicators of health-related events in local productivity environments. The research is based on local regulations and the international standard ISO 45001 (International Organization for Standardization) to measure worker participation in risk prevention aspects in labor productivity areas. In Peru, the evaluation or measurement of these aspects is designed for small groups or specific cases, such as in mining and transportation companies, and there is a certain insufficiency in robust psychometric and econometric validation (International Organization for Standardization, 2018).

Answer Question 2: What are the most widely used econometric methods for estimating the causal impact of public policies on occupational health, and what advantages or limitations do they present in each study?

When discussing econometric studies of the impact of public policies on occupational health, emphasis is placed on health economics as the central axis from which the entire idea is generated, since it is in this aspect that this research is situated.

To identify some econometric methods, we must first recognize the evolution of the concept of health economics, which has managed to adopt and refine quantitative methodologies based on the observation of health programs and policies. In areas such as strengthening statistical and econometric analysis, health economics presents advanced tools such as multivariate regression analysis, longitudinal and panel data models, survival analysis, and discrete choice models. On the one hand, multivariate regression refers to the control of several factors that can simultaneously affect the health status and healthcare costs of patients; continuing with longitudinal data models, which translate into the monitoring of patients, or groups of patients, over time periods, as well as panel data models, which fulfill the same function but with a more technical and macro approach; survival analysis, which, by its name, is understood as the study of the times between a disease relapse, the patient's death, or the amount of time remaining before a possible event; Finally, discrete choice models are used in the field of health economics as a way of studying decision-making in health insurance and services (Cantarero Prieto & Oliva Moreno, 2016).

Additionally, the econometric method of fixed effects models on panel data (similar to longitudinal data models), but with a work-based approach, serves as a tool for constant observation at the individual level, while also allowing for the control of bias generated after estimating invariable characteristics within the work or personal environment of workers, such as: personality, health care habits, genetic background in terms of heritable diseases, and level of awareness (Erhel et al., 2024). Meanwhile, it is especially useful for determining causal estimates and determining changes in occupational health conditions over a long period of time.

Another econometric regression method is multiple linear regression, or MLR, which involves two related types of variables: the dependent and the independent variables. In a study by [unknown/unclear] (Niebuhr et al., 2022), occupational health indicators are considered dependent variables, such as symptoms of stress, efficiency or job capacity and satisfaction. These variables are related to independent variables based on characteristics of the work environment, such as working from home, teleworking, autonomy, family presence, gender, quality of the technological equipment used for home-based work activities, as well as the worker's age. As the study suggests, the research process was carried out in the context of a pandemic, where these indicators and econometric studies were very important in determining the functionality and survival of certain companies in this new context.

Other methods that can be compared to MLR, and that can be applied to specific contexts in occupational health and, **in general, to the industry with productive labor, are the following**

- Differences in Differences (DiD) by its nature compares pre- and post-policy changes between work and other groups. In terms of comparisons with the regression approach, this econometric method allows the effects of public policies to be isolated if they follow parallel trends. In other words, it works based on an assumption, since if the policy were not implemented, the trend in the results would indicate the same thing for both groups, the treatment group and the control group.
- PSM is responsible for grouping individuals, workers within the context of occupational health, who have notable similarities and who may be exposed to public policy into pairs, either within treatment or control groups. This method differs from the regression model in its

primary objective, which seeks to mitigate selection bias by seeking details that differentiate workers from one another, aiding in the policy implementation process.

- Unlike DiD and MLR, this method uses thresholds to identify continuous variables that cross a certain threshold, with policies and interventions assigned based on established thresholds. Although similar to MLR, this regression has great potential for establishing several notable causalities.
- Instrumental Variance (IV) or Two-Stage Least Squares (2SLS) is a statistical econometric method that estimates causal relationships in the context of an endogeneity problem, that is, when one or more instrumental variables are involved in the implementation of a public policy. It differs from LRS in that one focuses on the operation when there are omitted variables, while the other does not.

Thus, to correctly estimate the causal impact of public policies on occupational health, advanced econometric methods must address the intention of overcoming simple observable design limitations (Kang et al., 2022). Therefore, the MLR econometric method is based on finding a single line within a space filled with variables, answering questions that arise during public policy implementation planning by describing how a dependent variable change with respect to changes in other variables.

Answer Question 3: What is the magnitude and direction of the impact of public policies on the main occupational health indicators reported in the quantitative scientific literature?

One of the most relevant occupational health indicators in the occupational area of a company or organization is the impact of the accident rate over an annual period or preferably one, under modifications of a usual policy applied in the workplace, highly variable indicators can be obtained from one year to the next. As described in the research by (Payá Castiblanque, 2020), which consists of a contextual analysis during the 2008 economic crisis and the austerity policies applied by the governments of Spain and Portugal since 2012, which consisted of reforms of specific laws and decrees that could improve competitiveness in the workplace, although they also caused increases in job insecurity values, the indicator being changed in the respective countries as follows: in Spain, the workplace accident rate increased by 11.05% between 2012 and 2016, contrasting with the usual average for the rest of the EU (European Union) countries, which increased only 1.05% in that period of years; except for

Portugal, which together with Spain manage to double the occupational accident rate from 3,589 to 3,209 per 100,000 workers, relating to the EU rate of 1,699 per 100,000 workers.

While the above is an example of the impact of public policies on occupational health indicators under external influences such as the global economic situation, their influence is more noticeable compared to aspects of psychosocial influence such as the work environment or awareness of safety measures and prevention of occupational risks (Garcés Torres et al., 2025). However, a psychosocial indicator recognized for its influence on workers' mental health is the PSC (Psychosocial Safety Climate), which reflects the level to which a company is committed to protecting the mental health of its workers. This is influenced by management support, the integration of internal policies of specific practices and protocols, (Hernández Pullido & Maheca Fontecha, 2025) and (Meneses Luna, 2024).

A study shows the PSC as a valid empirical indicator, where it is used under five key elements: specific guidelines, national regulations, sectoral regulations, local surveys, and political priority. It indicates a positive relationship between this indicator and another one generated by the authors, which is called National Policy Index (NPI), allowing us to identify that the increase in the solidity, diversity and structuring of public policies favors the protection of the psychological health of workers (Potter et al., 2024).

Therefore, mental health is an important component of organizational structure for companies, representing a key component in the normal economic system of any productive institution or organization. As described (Collier et al., 2024), the relationship between the sense of recognition from employers and organizational justice (or fairness) generates an average organizational scale of 5.61 out of 7, meaning that fair organizational practices provide greater job satisfaction.

Regarding the main premise, the magnitude of the impact of public policies is directly related to Occupational Health and Safety (OHS) practices, which are very important in the industrial sector due to the percentage of accidents and occupational hazards inherent in the industrial production process. However, there are obstacles to the implementation of occupational health policies linked to OHS practices, the effect of which can be moderated using Adjusted Odds Ratios (AORs), which allow estimating the magnitude and direction of the impact of each factor that may affect such

implementation, as shown in the following Table 4.

Table 4: Factors Associated with the Impact of SSO Practices.

Factor	AOR value	Direction of effect	Interpretation in the productive industrial context
Lack of regulation on SSO practices	1.64	Positive, since the percentage of risk of carrying out insufficient practices is increased.	The lack of strict regulation of preventive measures can lead to an increase in non-compliance with basic occupational safety standards, as well as with health in this social field.
Incorrect supply of PPE	1.42	Positive, as it increases the risks associated with accidents during the workday due to the lack of protective equipment.	The proportional relationship generated by this factor means that, due to insufficient access to prevention equipment, the value corresponding to unsafe practices increases.
Lack of support managerial	1.19	Positive, due to the increase in occupational risks due to a lack of attention from administrators in the workplace.	When commitment from the leaders of work groups within a company or organization is weak, it directly affects the recognition and dissemination of good OSH practices.
Lack of incentives	1.31	Positive, since without reward the probability of success of prevention policies in the implementation process is affected.	At the beginning of a prevention and awareness process, it is important to create a competitive environment conducive to developing a culture based on OSH practices. However, a lack of rewards, in the workplace, can hinder the effectiveness of this development.

Note: Developed based on information available in the authors' research (Debela et al., 2023).

The values shown in the table allow us to observe the level of impact of the factors associated with noncompliance with OSH practices. Of these, the lack of occupational safety regulations is the most influential, according to the study's authors; The insufficient supply of Personal Protective Equipment (PPE) is also a contributing factor to the weakening of the preventive culture within the industrial environment.

4. DISCUSSION

Regarding the answer to the first question, some public policies reveal statistically observable effects on occupational health and stand out for their ability to shape decision-based environments. This is reflected in the application of frameworks such as GRADE Evidence to Decision (EtD), a method that allows for the correlation of regulatory decisions and productivity indicators, such as accident rates and lost productivity. Additionally, the implementation of ISO 45001 standards in countries in the region shows that employee participation in Occupational Health and Safety (OHS) management systems can reduce occupational health risks, albeit with methodological limitations. Consequently, the available empirical evidence offers optimistic results,

but it depends on the specific business context and the level of implementation of the policies described. The most relevant level is the assessment of causality in occupational health, particularly in highly informal sectors or those with developing regulatory frameworks.

On the other hand, the answer to the second question shows that the debate surrounding econometric approaches dedicated to estimating the causal impact of public policies on occupational health clearly divides sophisticated methodology from the growing branch of economics that addresses these issues (health economics). From conventional approaches such as Multiple Linear Regression (MLR), which analyzes the relationship between working conditions and health outcomes such as stress and satisfaction, to more intricate models, such as panel data with fixed effects, which control for unobservable individual factors, there has been a progression in methods used to capture the impacts of policies in more complex, heterogeneous, and dynamic environments. More robust frameworks such as Difference-in-Differences (DiD), Propensity Score Matching (PSM), Regression Discontinuity Design (RDD), and Instrumental Variables with Two-Stage Least Squares (IV/2SLS) allow

researchers to go beyond the limitations of basic observational designs and thus provide estimates that approach reliable causality. Each of these methods has specific advantages, such as: DiD, which compares groups before and after the intervention with the assumption of parallel trends; PSM, which reduces selection bias; RDD, which uses institutional thresholds to claim causality; and IVs, which address endogeneity concerns. Together, these approaches provide a comprehensive and sophisticated approach to estimating the real-world impact of public policies on occupational health and provide significant evidence for their design, implementation, and refinement in real-life work settings.

To ensure methodological clarity, the connection between econometric approaches and the reviewed studies is made explicit. Quasi-experimental designs such as DiD and PSM were applied in studies by García Sánchez & Cardozo Brum (2017), Reyes Allpoc & Ceferino Eguizábal (2025), and García Pérez (2013). Regression-based approaches, including multiple and logistic regression, were adopted in works such as Debela *et al.* (2023), Galindo Salazar (2025), Ilbay (2025), and Tarcaya & Anciénaga (2024). Panel data models with fixed effects were employed by Erhel, Guergoat-Larivière & Mofakhami (2024), while multilevel regression was implemented in Potter *et al.* (2024). Other studies, such as Niebuhr *et al.* (2022) and Meneses Luna (2024), used cross-sectional regression models to estimate associations between working conditions and health outcomes. In contrast, normative or framework-based contributions (e.g., ISO, 2018; Alonso-Coello *et al.*, 2018) provided conceptual structures without econometric modeling. This distribution highlights the diversity of methodological strategies, with quasi-experimental approaches representing a minority but offering stronger causal inference compared to descriptive or framework-based analyses.

Ultimately, the answer to the third question shows that the magnitude and direction of the impact of public policies on occupational health varies considerably depending on the economic, institutional, or sectoral context. An example of this, taken from the literature included in this study, is the sharp increase in the incidence rate of occupational accidents in Spain and Portugal following the implementation of austerity policies, highlighting the proposition that legislative reforms aimed at competitiveness tend to adversely affect occupational safety. The increase they document contrasts sharply with the more moderate average

increase recorded in the rest of the EU countries, a marked difference that further highlights the sensitivity of health indicators to sudden regulatory and economic changes. On the other hand, other studies have documented positive impacts when policies are aimed at strengthening occupational health and safety through clear rules, national surveys, and political commitment, resulting in tangible improvements in employees' mental health and overall well-being. However, the effective implementation of these policies faces certain obstacles, particularly in industrial settings where occupational health practices are mandatory. Issues such as a lack of regulation, a scarce supply of occupational health and safety equipment, a lack of managerial support, and unfulfilled incentives are strongly associated, according to regression-based findings, with a worsening of the preventive culture.

5. CONCLUSIONS

The results section shows that public policies related to occupational health appear to have statistically significant impacts, especially when based on clear decision-making frameworks and methodologies, such as GRADE Evidence to Decision (EtD) or the implementation of the ISO 45001 standard. These policies have resulted in a reduction in occupational injuries, illnesses, and absenteeism, provided there is an appropriate organizational structure and employee participation. However, the impact also depends on the level of regulatory development and the extent of effective implementation, especially in environments that emphasize preventive action and an organizational safety culture.

Regarding the methods adopted and the estimation of the causal impact of policies, the study identifies a variety of approaches, ranging from simple models such as multiple linear regression to more advanced tools such as DiD, PSM, RDD, and IV/2SLS. These econometric methods help control biases, model causal relationships more appropriately, and cope with observational or quasi-experimental contexts; however, their application depends on the study design, data quality, and the correct definition of methodological assumptions.

On the other hand, health economics emerges as a significant discipline in the organization of these methodologies and their use in public policy development. Finally, to analyze the impact of the policies studied, contexts such as the economic, institutional, and sectoral were considered. These contexts, with some modifications specific to health policies, appear to have generated a positive impact

in the medium and long term. Conversely, factors such as the lack of regulation, the inadequate provision of protective elements, and managerial neutrality pose problems within structures that lack

normativity, and this is directly related to the AOR in its most recent form, with the culture of non-prevention.

Acknowledgements: The authors wish to express their sincere gratitude to the Universidad Técnica de Ambato and the Universidad Técnica Estatal de Quevedo. Furthermore, we extend our heartfelt appreciation to the Anonymous Reviewers whose thoughtful and constructive recommendations greatly enhanced the quality of this paper. Their expertise and feedback played a crucial role in optimizing our research and ensuring its rigor and credibility.

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