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Study on the Impact of Macroeconomic Changes on Adolescent Mental Health

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Abstract: With the continuous development of economy and technology, people's lifestyles are slowly changing, but the new generation of teenagers do not seem to be happier because of the improvement of economic level. According to statistics, more and more teenagers seem to have psychological problems to varying degrees. Paying attention to the mental health of teenagers is a topic that the whole society should pay attention to. This article selects the nominal GDP growth rate, population growth rate and CPI of the United States as independent variables, and the prevalence of MDE among adolescents from 2014 to 2023 as the dependent variable, attempting to explore the relationship between the macroeconomic level and adolescent mental health. The results show that population growth is negatively correlated with adolescent psychological problems, but higher GDP growth rates and higher inflation rates (measured by CPI) are associated with higher MDE prevalence rates. This result can remind the government that while developing the economy, it should also focus on using public resources to protect the healthy development of adolescents.

Keywords: Mental health, adolescents, economy.

1. Introduction

Mental health of adolescents is a significant area of focus within public health, as it sets the foundation for lifelong emotional well-being. A systematic review of literature on adolescent mind health, particularly those interventions that are interaction-based, provides lots of fabulous insights into the effectiveness of a great number of strategies implemented in schools and communities [1].

Mental health diseases often emerge during childhood and adolescence, with estimates suggesting that about 50% of conditions start by the age of 14 years old [2]. The World Health Organization (WHO) highlights that mental health encompasses more than just the lack of disease; it is a condition of overall wellness that empowers people to cultivate their skills, manage stress effectively, and contribute constructively to the community [3]. Interventions targeting adolescent mental health have been implemented in schools and communities, recognizing the importance of social interactions in development. These interventions aim to foster supportive interactions among different actors, including parents, friends, schoolteachers and mental health professionals [4]. These intervention strategies can result in reduced instances of disruptive actions and emotional issues like depression and anxiety, simultaneously boosting interpersonal abilities and individual well-being.

Schools are considered optimal environments for mental health interventions due to their role in the daily lives of adolescents. They provide a setting where social and cognitive development can be

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nurtured through social interactions. Community involvement is also crucial, as it provides a broader context for support and intervention [5]. Cultural appropriateness is a key factor in the success of mental health interventions. Programs that are grounded in the cultural context of the community they serve are more likely to engage participants effectively and achieve positive outcomes [6]. Research has shown that interaction-based interventions can have a positive effect on the mental health of children and adolescents. These interventions can decrease symptoms of mental disorders and promote emotional well-being. However, there is a need for further research to understand the specific impact of different types of interactions on mental health outcomes [7].

Economic growth itself is often seen as an important factor in social development and improving the quality of life. However, it may also have some negative effects on adolescent mental health: Increased pressure and expectations: Economic growth may bring higher social expectations and personal pressure. Adolescents may feel pressure from family, school, and society to succeed in their studies and future careers. This pressure may lead to anxiety and depressive symptoms [8]. Materialism and value changes: Economic growth and the rise of consumer culture may lead to the strengthening of materialistic values, which may affect adolescents' values and life satisfaction, thereby affecting their mental health [9].

Changes in family structure and parent-child relationship: With economic development, family structure may change, for example, parents may spend less time interacting with their children due to work reasons, which may affect parent-child relationships and in turn affect adolescents' mental health. Increasing social inequality and competition: Economic growth may increase social inequality, and adolescents may feel the pressure of social comparison due to differences in family economic conditions, which may lead to inferiority complex and mental health problems. Fast-paced life and reduced leisure time: The fast-paced life brought about by economic growth may reduce adolescents' leisure and relaxation time, which may affect their mental health and well-being. Social media and internet addiction: With economic development, adolescents may have more access to and dependence on social media, which may lead to internet addiction, sleep problems, and comparison on social media, which in turn affects their mental health [10].

This article hopes to explore whether, as the economic level continues to improve, attention to the mental health of adolescents has been neglected, and whether mental health problems among adolescents have become more common.

2. Methodology

2.1. Data Source and Description

The Substance Abuse and Mental Health Services Administration (SAMHSA) annually administers, which offers comprehensive, nationwide data regarding tobacco, alcohol, and illegal drug consumption; substance-related disorders; treatment for substance use; mental health concerns; and the utilization of mental health services among the U.S. civilian population, excluding institutionalized individuals, who are 12 years of age and older.

In 2023, 18.1% of individuals aged 12 to 17, equating to 4.5 million, experienced a major depressive episode (MDE) within last year, with 13.5%, or 3.4 million, enduring severe impairment due to MDE. This analysis draws on the proportion of adolescents with a past-year MDE spanning from 2014 to 2023.

Economic growth figures are sourced from the Bureau of Economic Analysis (BEA) and Trading Economics, whereas demographic expansion rates are derived from Macrotrends and the FRED database.

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2.2. Indicator Selection and Description

During 2023, a significant 31.9%, or 8.3 million, of the 12 to 17 age group underwent mental health treatment within the last 12 months. Among those who had a MDE in last year, numbering 4.5 million, 59.8%, which is 2.7 million, accessed mental health services. Conversely, approximately 40%, equating to 1.8 million, of this MDE-afflicted demographic went untreated for mental health issues in the same period. This underscores MDE as a significant indicator of the broader spectrum of mental health challenges faced by adolescents (Figure 1 and 2).

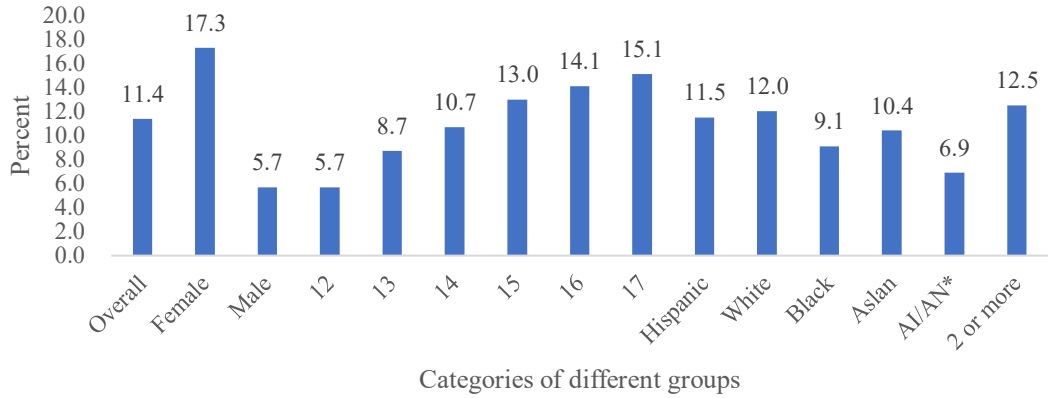

Figure 1: 12-month Prevalence of Major Depressive Episode Among U.S. Adolescents (2014)

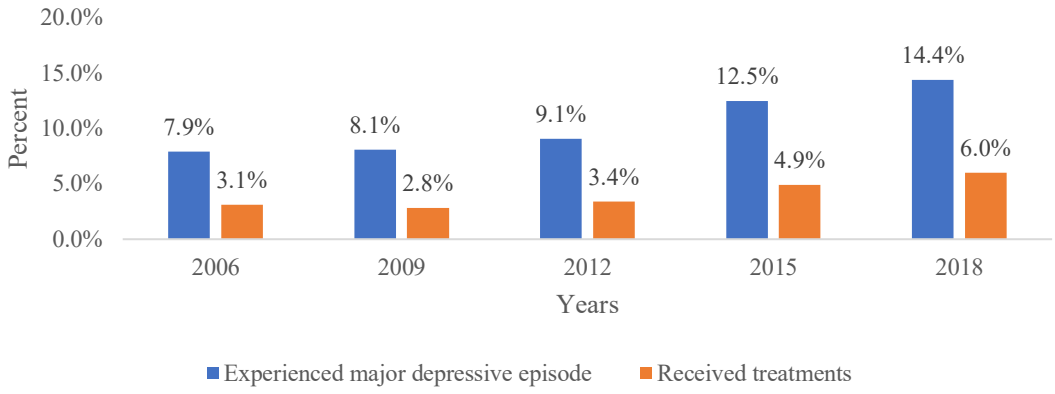

Figure 2: Percentage of U.S. teenagers (12-17) experiencing MDE/receiving treatment

Nominal GDP and CPI are two important indicators in economics, and they represent different economic concepts. Nominal GDP refers to the total market value of all final goods and services produced by a country or region in a certain period (usually one year), without adjustment for inflation or price changes. It directly reflects the scale of economic activities, but does not take into account changes in the price level. When prices rise, nominal GDP will also increase, but this does not mean actual growth in economic output, because the increase may only be due to price increases caused by inflation.

CPI is an indicator that measures the changes in the price level of consumer goods and services of residents in a country or region over a certain period of time. It is calculated by comparing the price changes of a fixed basket of consumer goods and services, which includes various goods and services in people's daily lives, such as food, housing, transportation, and medical care. An increase in CPI means an increase in the cost of living for consumers, that is, inflation; a decrease in CPI means

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deflation. CPI is an important tool for measuring purchasing power and inflation, and is also an important basis for adjusting wages, pensions, social security funds, etc.

In short, nominal GDP shows the total value of an economy's output, while CPI indicates changes in the cost of purchasing that output. Together, the two can help analyze the quality of economic growth and trends in cost of living.

2.3. Method Introduction

Through linear regression analysis and other methods, the impact of GDP growth rate, population growth rate, and CPI on adolescents suffering from MDE was analyzed, and the analysis results were statistically analyzed.

3. Results and Discussion

First, this research performed descriptive statistics for all variables and the results are shown in table 1. The average of percentages of MDE in 10 years is 15.5% and standard error is 0.96%. Meanwhile, the average of nominal GDP growth is 2.18% and population growth is 0.63% with CPI 2.73%.

Table 1: Descriptive Statistics

	Percentage of MDE	GDP	Population	CPI
Average	15.50%	2.18%	0.63%	2.73%
Standard Error	0.96%	0.67%	0.06%	0.73%
Median	15.05%	2.29%	0.69%	1.95%
Majority	-	2.29%	0.80%	-
Standard Deviation	3.05%	2.11%	0.19%	2.30%
Variance	0.09%	0.04%	0.00%	0.05%
Kurtosis	-147.82%	450.67%	-134.39%	232.59%
Skewness	32.45%	-98.96%	-54.66%	148.26%
Min	0.118	-2.77%	0.31%	0.10%
Max	0.201	5.95%	0.83%	8.00%
Sum	1.55	0.2177	0.0627	0.273
Observation	10	10	10	10

This paper also made correlation test between chosen variables and it shows that there is strong negative correlation between MDE and population growth. CPI and MDE are positively related and GDP growth is weakly correlated with MDE.

Then, conducted a linear regression analysis using GDP year-over-year as the independent variable and observed several key metrics. The correlation coefficient, or Multiple R, was a low 0.1382, signifying a very weak linear association with the dependent variable. Therefore, it indicates that changes in GDP have a minimal linear effect on the dependent variable (table 2).

Table 2: Correlation Statistics

	MDE	GDP	Population	CPI
MDE	100.00%			
GDP	13.83%	100.00%		
Population	-98.64%	-10.84%	100.00%	
CPI	78.65%	29.80%	-75.13%	100.00%

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The R2 value of 0.0192 reveals that 1.92% of the variance in the MDE prevalence can be attributed to the GDP, further emphasizing its poor predictive power. An Adjusted R2 of -0.1032 is notably negative, which is atypical and often points to a model that poorly aligns with the data. This negative value implies that the inclusion of the GDP as an independent variable does not enhance the model's predictive accuracy.

The Standard Error, at 0.0322, indicates the average prediction error, with lower values being preferable. Although this figure is relatively low, it is not indicative of a reliable model given the other statistical measures.

Regarding the model's intercept, it stands at 0.1506 with a highly significant p-value of 0, proving that it is statistically meaningful. However, the significance of the intercept does not compensate for the lack of significance in the other coefficients.

Specifically, the GDP coefficient is 0.1999, but its p-value of 0.7032 is considerably high, indicating that it does not significantly predict the dependent variable – MDE prevalence. In summary, the initial regression model using GDP as the predictor is deemed inadequate due to the low correlation coefficient, negative Adjusted R2, and the non-significant p-value of the GDP coefficient. This analysis indicates that GDP is not a reliable predictor for the dependent variable in question (table 3).

Table 3: Regression with GDP

	Coefficients of Reg 1	Std. Err of Reg 1	t Stat of Reg 1	P-value of Reg 1	Lower 95%	Upper 95%
Intercept	0.1506	0.0150	10.0694	0.0000	0.1161	0.1851
GDP	0.1999	0.5060	0.3950	0.7032	-0.9669	1.3667

In the regression analysis using population year-over-year as the independent variable, it observed a remarkably high Multiple R value of 0.9862. This figure underscores a robust linear correlation with prevalence of MDE, showing that changes in population are closely tied to the dependent variable's fluctuations.

The R2 of 0.9732 is notably high, indicating that 97.32% of the var in MDE prevalence could be explained by the population. This substantial proportion points to an excellent model fit. The Adjusted R2, at 0.9702, also remains impressively high, reinforcing the model's effectiveness even when displaying for the number of predictors involved.

Next is about the analysis of standard error, which is exceptionally low measured at 0.0052, signifying that this regression is highly accurate and closely connected with the actual values of the dependent variable. The intercept, at 0.2531 with an obviously low p-value of 0, highlights its significance in the regression of population. The coefficient for the population variable stands at -15.6531, and its p-value is equally low at 0.0000. This indicates that the population is a statistically important predictor of the MDE prevalence considered as the dependent variable.

In conclusion, the regression model incorporating population as the predictor demonstrates a high degree of accuracy and reliability. The high values of Multiple R, R Square, and the significant coefficient for the population variable all point to a superior model in comparison to the previous one. This analysis confirms that population is a crucial and statistically significant factor this regression with population (table 4).

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Table 4: Regression with population yoy

	Coefficients of Reg 2	Std Err of Reg 2	t Stat of Reg 2	P-value of Reg 2	Lower 95%	Upper 95%
Intercept	0.2531	0.0060	42.1179	0.0000	0.2393	0.2670
Population	-15.6531	0.9205	-17.0048	0.0000	-17.7759	-13.5304

In the regression analysis featuring the Consumer Price Index (CPI) as the independent variable, it identified a correlation coefficient, or Multiple R, of 0.786. This figure means a moderate positive linear relationship between CPI and the dependent variable, indicating that as CPI rises, the dependent variable tends to increase as well. The R Square value of 0.619 reveals that 61.9% of the variance in the prevalence of MDE is attributable to changes in CPI. This substantial proportion indicates that CPI is a significant indicator of the regression.

Besides, the Adjusted R2 stands at 0.571. Although slightly lower than the R Square, it still signifies a reasonable model fit, considering the single predictor being analyzed. It is also obvious that standard error is 0.020. A lower value of the Standard Error is indicative of a model that closely aligns with the data, and the value of 0.020 here suggests a good fit. The intercept, at 0.1265, is also significant with an extremely low p-value of 0.0000. This value represents the expected outcome for MDE prevalence when the CPI is zero.

Regarding the CPI itself, the coefficient is 1.0436 with a p-value of 0.0070, which is significantly lower than the standard significance threshold set in the regression of 5%. This statistical significance, coupled with the positive coefficient, implies that an increase in CPI is associated with a corresponding increase in the dependent variable (table 5).

In conclusion, the regression model demonstrates a relatively strong positive correlation between CPI and MDE prevalence, with the model's parameters indicating a reliable fit to the data.

Table 5: Regression with CPI

	Coefficients of Reg 3	Std Err of Reg 3	t Stat of Reg 3	P-value of Reg 3	Lower 95%	Upper 95%
Intercept	0.1265	0.0101	12.4997	0.0000	0.1032	0.1498
CPI	1.0436	0.2898	3.6016	0.0070	0.3754	1.7117

However, all analyses are based on a small sample size, which can lead to unreliable results. In general, regression analyses with larger sample sizes are preferred for more accurate and reliable conclusions. So it could primarily be concluded that prevalence of MDE is positively related to GDP and CPI and negatively related to population.

Furthermore, the following tries to explain the logic behind this result: Economic pressure: Family economic pressure may have a negative impact on adolescents. CPI rise may lead to a decline in family purchasing power and increase life pressure, which may be passed on to adolescents and affect their emotional health. Resource allocation: GDP growth rate may reflect economic growth, but if growth is uneven, it may lead to unfair resource allocation. Adolescents may not have access to necessary education and mental health resources, which may increase their risk of MDE. Social inequality: Economic growth may exacerbate social inequality, and adolescents may feel the difference in socioeconomic status, which may affect their self-esteem and happiness, thereby affecting mental health.

Family environment: Economic pressure may affect the family environment and the psychological state of parents, which in turn affects adolescents. Parents' stress, anxiety, and depression may be passed on to adolescents through imitation and social learning mechanisms. Education and

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employment prospects: GDP growth rate may affect education investment and the health of the job market. If economic growth does not translate into better education and employment opportunities, adolescents may feel uncertain and anxious about the future. Social support and network: Economic difficulties may weaken social support networks and reduce adolescents' opportunities to obtain emotional support and positive role models, which may increase their risk of MDE. Access to health services: Changes in CPI and GDP may affect household and government spending on health services. If economic growth does not lead to better services for adolescents with mental problems, they may not receive necessary treatment. Lifestyle changes: Economic changes may affect adolescents' lifestyles, including diet, physical activity, and social activities. For example, a high CPI may cause healthy foods and leisure activities to become more expensive, affecting adolescents' overall well-being. Psychosocial factors: Adolescents may experience more psychosocial stressors including pressures coming from study, peer relationship problems, and identity issues due to economic pressures, which may be associated with an increasing prevalence of MDE.

4. Conclusion

With such a rapid development of economy and technology in the whole world, the mental health problems of young people have become more obvious. For society, protecting the mental health of young people is an issue that cannot be ignored. This article chooses several macroeconomic indicators to analyze the trend between economic level and MDE prevalence of adolescents. The results proved that there are more and more teenagers with MDE accompanied by the development of economy and technology.

Nevertheless, there is still some limitations in my research. It is important to recognize that there may be complex interactions between these factors and that experiences may vary greatly between different groups of adolescents. In addition, these relationships may be influenced by factors such as culture, social policies, and family dynamics. Therefore, more research is needed to explore the exact nature of these relationships and to provide appropriate support and interventions for adolescents.

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