The Dynamic Effects of Urban–Rural Income Inequality on Sustainable Economic Growth under Urbanization and Monetary Policy in China

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Abstract: Income inequality in China has become increasingly serious since the beginning of the economic reform period in the 1970s, with urban–rural income inequality playing a large role. Urbanization policy and monetary policy are currently important economic policy tools for the Chinese government. In order to investigate the influence of inequality on the economy and to provide recommendations for ensuring the sustainability of growth, we study the effect of urban–rural income inequality on economic growth in the context of urbanization and monetary policy in China between 2002 and 2021. Using a flexible time-varying parametric structural vector auto-regression (TVP-VAR) model and a robust Markov chain Monte Carlo (MCMC) algorithm, our empirical results show that the effect is time-varying, with inequality promoting growth in the early years but affecting it adversely at later stages. Currently, urbanization mitigates inequality and promotes growth simultaneously, while easy monetary policy worsens inequality and affects growth adversely in the long term. We suggest that the authorities need to consider the implementation of policy rebalancing to ensure that the sustainability of economic development is not jeopardized because of worsening income disparity. Proactive urbanization policy and prudent monetary policy are viable rebalancing options.

Keywords: income inequality; economic growth; urbanization; monetary policy; TVP-VAR model; policy rebalancing

1. Introduction

During recent decades, rising inequality has been accompanied by a downward trend in the rate of economic growth in many economies, reflecting a long process of stagnation [1]. This seems to imply that there is some connection between inequality and growth. In this environment, there has been renewed concern regarding the influence that income inequality has on economic growth.

One of the important manifestations of sustainable economic growth is that it can be maintained over time without a pause, much less a recession. The “Transforming Our World: the 2030 Agenda for Sustainable Development” agenda (2030 Agenda) [2], endorsed by the United Nations, went into effect in 2016 and sets out 17 Sustainable Development Goals (SDGs) calling for changes to create just societies that ensure prosperous and fulfilling lives for all, and for the world to find a sustainable path toward this goal. A sustainable path means economic development that is inclusive and resilient to unexpected shocks. In particular, Goal 10 of the 2030 Agenda is to “reduce inequalities within and among countries”, which means that economic and social policies, including fiscal and migration policies, should progressively improve equality levels by 2030. In fact, while inequalities among countries may have decreased in the last fifty years, but inequalities within countries are still high [3], and large internal income inequalities adversely impact the economic growth of OECD countries [4]. Goal 10 is particularly important against the backdrop of the COVID-19 pandemic, which
affected vulnerable groups most severely and significantly deepened income inequality [5]. Against this backdrop, the difficulty of successfully implementing the 2030 Agenda has increased significantly, especially for China.

Income inequality is also currently high in China, and concerns about the sustainability of economic growth are growing. It is well known that contemporary China has undergone an important economic transition. Prior to comprehensive economic reforms in the 1970s, China was considered a relatively egalitarian society, and income disparity was moderate at that time [6]. In the context of reform, the shift from a planned economy with strict government control to a market economy with private decision-making not only meant that administrative planning was replaced by a market system but also resulted in the gradual disappearance of previous egalitarianism. Productivity factors such as capital, knowledge, skills, and innovation were re-recognized. It became the new social consensus that people would receive income based on their contributions, whereas, before that, individual income was uniformly determined by the government. In particular, since China’s formal participation in the WTO from 2001 onward, its economic development has entered the fast lane, as GDP grows at an average annual rate of 8.5% and per capita income has significantly increased. However, at the same time, different people have benefited differently, and the level of income inequality has risen rapidly. China’s Gini coefficient has generally tended to rise since the beginning of reform and opening up, reaching its maximum value of 0.491 in 2008, and has only stabilized and shown a slight decline in the last decade. In particular, the growing income disparity between urban and rural areas has been a major force driving income inequality in China. Urban–rural income inequality has been strongly associated with the Gini coefficient [7]. From 1978 to 2019, the income inequality between urban and rural areas in China, as measured by the ratio between urban and rural household per capita income, was on an upward trend, increasing from 2.57 to 2.64 and reaching a maximum value of 3.14 in 2007. Even by international standards, China’s urban–rural income disparity remains extreme [8], with the ratio being between 1.2 and 2.1 in the other developing countries of Asia, such as India, Pakistan, Indonesia, and Malaysia [9].

The income inequality between urban and rural areas in China is not just by quantity but also reflected in composition structure. According to data from China’s National Bureau of Statistics, urban household income from wages and salaries accounted for approximately 56% in 2020, while the share of rural households was approximately 43%. Rural households had a larger share of operations income of approximately 33%, which is 20% more than that of urban households. In addition, the property income of urban households was approximately 9%, which was four times more than that of rural households. Finally, both sides had roughly the same proportion of transfer income. It is clear that income from wages and salaries dominates urban households, and the share of property income for urban households is significantly higher than that of rural households. For rural households, the share of operating income, although still large, has declined significantly in recent years. This is mainly because rural laborers can take up nonagricultural jobs in cities with urbanization, which results in a significant increase in their income share of wages and salaries. Urbanization seems to be a key factor influencing the process of urban–rural income inequality. Indeed, income disparities between urban and rural areas have emerged as a widespread occurrence in the economic development of many countries around the world. The history of income inequality in China during the previous decades is similar to what happened in the United States during its early phases of development. The United States’ urbanization rate rose from 10% in 1820 to 55% in 1940, with rising inequality in the process but a gradual decline thereafter [10]. In the specific case of China, within the first 30 years after economic reform, it was also at the early stage of urbanization. During that time, the fast-developing industrial and service sectors of cities were both drivers of economic growth and sources of income inequality. However, along with cities having absorbed most of the population, income inequality seems to have gradually eased in the last decade.
Thus, to some extent, the emergence of income disparities between urban and rural areas within a country is a natural consequence of the market forces that generate economic growth. Given this, how should policy authorities respond to the still-severe urban–rural income inequality in China in order to ensure the sustainability of economic growth? In fact, through sensible policy formulation and implementation, serious income inequality can be avoided even while maintaining economic growth. Urbanization policy and monetary policy are currently important economic policy tools for the Chinese government. In terms of urbanization policy, China’s urbanization has been a relatively slow process. This is due to China’s past, on the one hand, placing too much emphasis on the development of small cities and inhibiting the expansion of large cities and, on the other hand, the strict household registration system that restricted the free migration of labor. China’s urbanization policy still has tremendous potential to further increase productivity and reduce income inequality by facilitating the reallocation of labor to cities. Another potential area is monetary policy. Unlike the inflation-targeting implementation framework adopted in the United States, China’s overriding target for monetary policy during the transition period is to ensure economic growth, and, as an emerging economy, the intermediate target is the M2 growth rate [11]. To put it another way, the central government sets the annual GDP growth target, and the central bank adjusts the M2 growth rate quarterly according to economic conditions to ensure that the GDP growth target is achieved. In particular, monetary policy is its main stimulus tool during periods of great fluctuation in economic performance. In fact, policy authorities seem to have developed a conditioned reflex to stimulate the economy by easing monetary policy significantly once growth becomes sluggish. In the case of the ongoing COVID-19 pandemic shock, for example, according to China’s central bank, the year-over-year money supply M2 growth rate jumped from 8.7% before the pandemic to 10.1%. As of the end of March 2022, the ratio was still as high as 9.7%. Against this backdrop, China’s monetary policy has been overly focused on growth targets at times, at the expense of just income distribution. Finally, compared to traditional monetary policy tools, urbanization policy is a structural tool that can have different effects on heterogeneous subjects in the one economy, and it may have a natural advantage in addressing urban–rural income inequality. Therefore, policy rebalancing through adjustments in urbanization policy and monetary policy may be able to ensure steady economic growth while preventing worsening of income inequality, thus providing conditions for sustainable development.

In summary, in the context of the COVID-19 Pandemic, global income inequality has become increasingly severe, and the successful implementation of the 2030 Agenda has become more difficult. Of particular concern to us is the fact that urban–rural income inequality, as the main force driving overall income inequality in China, may have an important effect on the sustainability of economic growth. China is currently undergoing a transformation in the way it grows, requiring more sustainable and harmonious economic growth in the future [12]. Therefore, it is against this background that our paper focuses on investigating the time-varying effects of urban–rural income inequality for sustainable economic growth under the context of urbanization and monetary policy in China. As far as we know, this issue has not been studied in previous research. More specifically, our investigation aims at the following questions: (1) How does urban–rural income inequality affect economic growth in China? (2) how does urbanization affect urban–rural income inequality and economic growth in China? and (3) how does monetary policy affect urban–rural income inequality and economic growth in China? In order to answer the above questions, we collected relevant data on China’s macroeconomy and conducted an empirical study using a TVP-VAR model. Unlike previous studies, our investigation found that: (1) Urban–rural income inequality in China promotes economic growth in the early years, but the effect turns negative in the later stages. (2) Urbanization in China is effective in mitigating urban–rural income inequality, but the effect becomes weaker during the economic recessions. Urbanization in China does not promote economic growth in the early years but is effective in stimulating economic growth in the later stages. (3) The worsening
effect of the easy monetary policy in China on urban–rural income inequality becomes stronger over time. While the easy monetary policy in China can promote economic growth in the early years, it is negative for economic growth at later stages. Thus, we argue that current urban–rural income inequality has affected economic growth adversely and that urbanization policy and monetary policy need to be adjusted and reformed in China. This is also instructive for other developing countries to prevent income inequality from worsening, thus ensuring economic growth sustainability. This paper contributes to the literature in the following ways: (1) It validates the time-varying effect of urban–rural income inequality on China’s economic growth; (2) it investigates the effects of urbanization and monetary policy on urban–rural income inequality and economic growth in China; and (3) it proposes policy rebalancing options that can reconcile urban–rural income equitability and sustainable economic growth.

The rest of the paper is structured as follows: Section 2 conducts a literature review and presents the research hypotheses, Section 3 describes the methodology and data we used, Section 4 presents the empirical results and discussions, and Section 5 presents concluding points.

2. Literature Review and Hypotheses

2.1. The Effect of Urban–Rural Income Inequality on Economic Growth

The main manifestations of income inequality differ from country to country, such as region, gender, ethnicity, and religion. In China, as mentioned earlier, urban–rural income inequality is the main manifestation of overall income inequality. Many scholars have studied the effect of income inequality on economic growth, both theoretically and empirically, and these provide important inspirations for our study. Kuznets [13] made pioneering contributions to theories on the nexus of income inequality and economic growth, presenting the famed inverted U-shaped curve, in which the inequality level initially rises with economic growth and then gradually declines. Subsequently, scholars have expanded and deepened the theoretical basis for this research and proposed many mechanisms that can explain how urban–rural income inequality influences economic growth, such as technological progress [14], investment [15], division of labor [16], fertility and education decisions [17], and human and physical capital accumulation [18]. The main underlying mechanism of the above theories is that urban–rural income inequality changes economic activities and then influences economic growth. Based on the finding of Benhabib [19], an economy may initially grow as urban–rural income inequality rises, and then further economic growth will be hindered as urban–rural income inequality worsens. In terms of the empirical literature, many scholars have found evidence suggesting income inequality can promote economic growth [20], while others have argued that increasing income disparity is harmful for economic growth [21]. Moreover, there is substantial evidence that the effect of income inequality on economic growth is not simply positive or negative. From a perspective over time, the effect is beneficial in the near term but detrimental in the long term [22]. From the perspective of development stage, the effect is unfavorable for developed economies while beneficial for developing economies [23]. The above theoretical and empirical literature implies that the function served by urban–rural income inequality during the economic growth process may not be constant but is characterized by time variation; that is, it evolves with the phase of an economy’s development.

The literature about China [24–26], similar to the aforementioned literature at the theoretical level, can also be interpreted with respect to consumption, investment, and human capital accumulation. However, considering the results of the empirical level, all scholars argue that urban–rural income inequality undermines economic growth, which contradicts the conclusions of the empirical literature mentioned earlier. We believe that this contradiction stems from two potential causes. First, the aforementioned studies on China are limited by data availability, and the time spans of selected sample periods are not sufficient for a comprehensive study. Second, the choice of research methods and model specifications for the aforementioned studies on China is problematic, as it is hard to obtain
a dynamic conclusion using static models. Synthesizing these insights, we hypothesize the following:

**Hypothesis 1.** The effect of urban–rural income inequality on China’s economic growth varies throughout time, with inequality promoting growth in the early stages but having a negative effect in the later stages.

2.2. The Effect of Urbanization on Economic Growth and Urban–Rural Income Inequality

Growth economic theory states that the basis of urbanization is the mechanism of the transfer of agricultural labor [27]; in other words, the essence of urbanization is the transformation of the economic structure. As the agricultural sector shrinks with economic development, there is a massive surplus of workforce in the countryside. Meanwhile, the expanding secondary and tertiary sectors in urban areas provide a large number of new jobs, thus attracting people to migrate from the countryside to cities [28]. Like many developing countries, China has adopted active urbanization policies by means of industrial restructuring [29]. Fixed asset investment has become an indicator of urbanization in China because it is an important manifestation of industrial upgrading and development [30].

Some scholars have pointed out that urbanization has been a major driver of modern economic growth [31]. The main reasons why urbanization can contribute to economic growth include human capital accumulation [32], infrastructure [33], and knowledge spillovers [34]. More specifically, the concentration of manufacturing and services and the short distances between suppliers, producers, and consumers in urban areas bring significant scale and agglomeration effects and make labor more productive [35]. Because of the limited marginal labor productivity in agriculture, farmers staying in the countryside will only be caught in inefficient involution, while their productivity will receive a qualitative leap if they enter cities. Migration is a rational market-based choice, as farmers with higher agricultural productivity will stay in the countryside, while those with lower agricultural productivity choose to migrate [36]. As a result, the productivity of rural households has generally increased, whereby migrating farmers achieve productivity gains by entering new industrial sectors, while the remaining farmers can boost economic growth by integrating land in order to take advantage of economies of scale to increase agricultural productivity. Around 2019, approximately 300 million migrant workers were living in urban areas [37]. Empirical studies have also found evidence that urbanization promotes economic growth in China [38].

In addition, some studies have pointed out that urbanization can effectively reduce urban–rural income inequality. Cities, where most enterprises are located and whose infrastructure needs to be built and maintained, require large amounts of migrant labor. Adequate labor mobility will contribute to reducing income disparities and inequalities across regions in a market economy. The migration of surplus labor from the countryside to cities is a balancing force that can respond to urban–rural labor market differences [39]. Wages will decline progressively due to labor supply increases in the urban labor market, while the incomes of farmers who remain in rural areas will gradually increase as local labor becomes scarce [40]. In addition, urban areas can influence rural income through consumption, remittances, improved rural land/labor ratio, higher prices for agricultural products, and the availability of nonagricultural jobs [41]. Meanwhile, some scholars have found evidence that urbanization in China has been effective in reducing urban–rural income disparity [42,43]. As shown in the analysis just presented, the findings regarding the effects of urbanization on economic growth and urban–rural income inequality are relatively consistent. Most scholars believe that urbanization is effective in promoting economic growth while also reducing urban–rural income inequality. Synthesizing these insights, we hypothesize the following:

**Hypothesis 2.** Urbanization can contribute to China’s economic growth while reducing urban–rural income inequality.
2.3. The Effect of Monetary Policy on Economic Growth and Urban–Rural Income Inequality

The study of monetary policy in macroeconomics has traditionally been based on the premise that economic growth is either exogenous or absent, and that the role of monetary policy is mainly reflected in its effect on business cycle fluctuations. However, Summers [44] pointed out that short-term fluctuations have a profound effect on economic activity, and in this way, they act on trends in economic growth. Thus, monetary policy can act on economic growth when responding to economic fluctuations. In some literature, the impacts that monetary policy has on economic growth have been comprehensively investigated, but conclusions are inconsistent. Some scholars conclude that, based on the monetary neutrality theory [45], monetary policy influences only inflation and has no effect on economic growth [46]. However, some scholars have argued that monetary policy is nonneutral, at least for a short-term period, due to price rigidity [47]. As research has progressed, many scholars have pointed out the effect of monetary policy on GDP growth [48,49], but the effect has a lag of approximately 2–3 years [50,51]. Over the last few years, scholars have further validated the idea that monetary policy has a significant impact on economic growth using methods such as structural VAR models or quasi-natural experiments [52,53]. The contribution of the monetary policy rolled out by China’s central bank to economic growth has also been confirmed [54,55].

Regarding the influence that monetary policy has on income inequality, scholars have studied channels of inflation, income distribution, and income composition. First, inflation is more harmful to the underprivileged because most of their income is not pegged to the price level, while the affluent are less affected [56]. Second, in terms of income distribution channels, the incomes of the relatively rich are largely influenced by fluctuations in unit wages, while the incomes of the impoverished are largely influenced by fluctuations in employment rates. Thus, monetary policy produces redistributive results in the incomes of different groups of people through different mechanisms of action [57]. Moreover, an easy monetary policy will widen income disparity by further reducing the salaries of low-skilled employees while asymmetrically increasing those of high-skilled employees [58]. Finally, in terms of income composition channels, the various sources of income have different responses to a change in monetary policy. The impoverished mainly depend on labor wages, but the rich are relatively more dependent upon capital gains. By raising the prices of financial assets, an easy monetary policy causes increased capital gains for the wealthy who own the majority of stocks and bonds [57]. Thus, from the perspective of theoretical analysis, monetary policy can influence income inequality, whereas an easy monetary policy may worsen income inequality. However, empirical studies have not yet reached consistent conclusions because of the mutually reinforcing or offsetting relationships among the channels and heterogeneity across countries. For example, easy monetary policy has widened the income disparity in Japan through rising financial asset prices [59], while easy monetary policy in the Eurozone has had the effect of reducing income inequality by stimulating employment [60]. There are fewer studies regarding the influence of monetary policy in China on severe and worrisome income inequality, especially urban–rural income inequality. Given the main channels via which monetary policy can influence the distribution of income among different groups summarized earlier, China’s migrant workers are low-skilled employees, and rural households rely mainly on labor income and are more vulnerable to unexpected inflationary shocks. Therefore, the preliminary analysis in our paper suggests that easy monetary policy may have further expanded the income disparity between urban and rural areas in China. Synthesizing these insights, we hypothesize the following:

**Hypothesis 3.** China’s easy monetary policy has boosted overall economic growth but it also worsened urban–rural income inequality.
3. Methodology and Data Description

3.1. Methodology

To be able to capture potential time-varying effects among the macroeconomic variables under study with a flexible and robust approach, we chose the TVP-VAR model for this paper. This is because it, being a timeseries model with multiple independent variables and time-varying coefficients, variances, and covariance, has stronger predictive power in studying macroeconomic time-varying characteristics relative to other VAR models [61]. The TVP-VAR model does not require that a dataset be split into several subsamples for testing variations of interaction mechanisms between variables. Thus, the risk of loss of information based on the overall sample is avoided.

To reduce the possibility of misspecification of traditional econometric models, Sims [62] pioneered the unrestricted VAR model. The model takes a multi-equation form and treats all variables as endogenous, thus allowing a better reflection of the interactions between variables. However, the unrestricted VAR model ignores the contemporaneous interaction between variables to simplify the estimation of parameters. Scholars have therefore improved the model by proposing the structural VAR (SVAR) model [63]. However, under the assumption that the parameters remain constant over the sample period, the aforementioned traditional VAR model, as a static model, is less effective in explaining interactions between variables in a changing and unstable economic system. Therefore, Primiceri [64] introduced a TVP-VAR model, having time-variant coefficients, variance, and covariance. The model was further refined by improving the method of maximum likelihood estimation of the parameters later [65]. It is this refined model that is used for the empirical study in our paper. The model has an additional time dimension through its time-varying coefficients, variances, and covariance and is able to capture exactly the time-varying interactions among variables of urban–rural income inequality, economic growth, urbanization, and monetary policy in China.

The TVP-VAR model is constructed based upon the traditional SVAR model and allows the parameters to vary with time. First, the traditional SVAR model can be expressed by the equation below:

\[ My_t = Z_1 y_{t-1} + \cdots + Z_q y_{t-q} + \varepsilon_t, \quad t = q + 1, \ldots, n, \] (1)

where \( M, Z_1, \ldots, Z_q \) represent \( p \times p \) variable coefficient matrices, \( y_t \) represents \( p \times 1 \) vector of observable variables, and the disturbance \( \varepsilon_t \) represents \( p \times 1 \) structural shock, which is supposed to obey a Gaussian distribution with the expression \( \varepsilon_t \sim \mathcal{N}(0, \Sigma) \), where:

\[ \Sigma = \begin{pmatrix} \sigma_1 & 0 & \cdots & 0 \\ 0 & \ddots & \vdots \\ \vdots & \ddots & \ddots & 0 \\ 0 & \cdots & 0 & \sigma_p \end{pmatrix} \] (2)

For identifying the contemporaneous interactions of structural shocks using recursive identification, we assume that matrix \( M \) has the following lower-triangular structure:

\[ M = \begin{pmatrix} 1 & 0 & \cdots & 0 \\ m_{2,1} & \ddots & \vdots \\ \vdots & \ddots & \ddots & 0 \\ m_{p,1} & \cdots & m_{p,p-1} & 1 \end{pmatrix} \] (3)

Then, Equation (1) can be expressed in a simplified version by the equation below:

\[ y_t = D_1 y_{t-1} + \cdots + D_q y_{t-q} + M^{-1} \Sigma \varepsilon_t, \quad \varepsilon_t \sim \mathcal{N}(0, I_p) \] (4)

where \( D_I = M^{-1} Z_I \) for \( I = 1, \ldots, q \). The new equation reorganizes the coefficient matrices \( D_I \). We stack the row’s elements of the new matrices. Then, we obtain \( R_t = I_p \otimes (y_{t-1}, \ldots, y_{t-s}) \).
and the $p^2q \times 1$ vector $\phi$, where $\otimes$ represents the Kronecker product. Based on this, the equation can be represented by the following form:

$$y_t = R_t \phi + M^{-1} \sum \varepsilon_t$$  \hspace{1cm} (5)

The parameters in Equation (5) are assumed to be constant. By relaxing this assumption and introducing parameters with time-varying characteristics, the equation is further improved to the following form:

$$y_t = R_t \phi_t + M_t^{-1} \sum \varepsilon_t, t = q + 1, \ldots, n$$  \hspace{1cm} (6)

where the coefficients of simultaneous equations, $M_t$, vectors, $\phi_t$, and covariance matrices of disturbances, $\Sigma_t$, can all vary over time.

To identify the dynamic time-variant features of the system and model the time-varying processes of these characteristic parameters, all parameters in Equation (6) are assumed to obey Brownian motion. Let $m_t = (m_{2,1}, m_{3,1}, m_{3,2}, m_{4,1}, \ldots, m_{p,p-1})$ represent the stacked vector of the elements below the main diagonal in $M_t$, and let $v_t = (v_{1,t}, \ldots, v_{p,t})$ obey the expression $v_{j,t} = \log \sigma^2/\sqrt{t}$ for $j = 1, \ldots, p$, $t = q + 1, \ldots, n$. More specifically, the dynamics of the parameters that can vary with time in Equation (6) are assumed to obey Brownian motion. Let

$$\phi_{t+1} = \phi_t + \varepsilon_{\phi_t}, \quad m_{t+1} = m_t + \varepsilon_{m_t}, \quad v_{t+1} = v_t + \varepsilon_{v_t}$$  \hspace{1cm} (7)

where $\phi_{t+1} \sim G(\mu_\phi, \Sigma_{\phi0})$, $m_{t+1} \sim G(\mu_m, \Sigma_{m0})$, and $v_{t+1} \sim G(\mu_v, \Sigma_{v0})$ for $t = q + 1, \ldots, n$.

Since parameters are difficult to estimate due to their time-variance properties, our paper adopts the MCMC algorithm for estimation. With a defined prior probability distribution, the MCMC algorithm can randomly pull samples from a high-dimensional posterior probability distribution using the Bayesian inference process. Then, estimates of the parameters, which include the unobservable latent variables, are obtained. In the model for this paper, the time-varying parameters are latent variables. We set a prior value to all unknown parameters, which are estimated recursively on the basis of the initial state. We suppose the parameter prior values obey a Gaussian distribution, in which the means are $\mu_{\phi0} = \mu_m = \mu_v = 0$, and the covariance matrices are $\Sigma_{\phi0} = \Sigma_m = \Sigma_v = 10 \times 1$. All elements belonging to the $i$-th diagonals of the covariance matrices obey the prior probability distributions: $(\Sigma_{\phi})^{-1/2} \sim Gamma(40,0.02)$, $(\Sigma_m)^{-1/2} \sim Gamma(40,0.02)$, and $(\Sigma_v)^{-1/2} \sim Gamma(40,0.02)$, where $Gamma$ represents the gamma distributions, which is in accordance with Nakajima [66].

3.2. Data Description

We estimate seasonally adjusted relevant quarterly macroeconomic data for China using a four-variable TVP-VAR model in this study. Due to data availability, the timespan of our sample lasts about 20 years, starting from the 1st quarter of 2002 and ending in the 3rd quarter of 2021. All data utilized for model estimation are sourced from official institutions such as the National Bureau of Statistics of China (NBS) and the People’s Bank of China (PBC).

To be specific, the urban–rural income inequality (II) variable is measured by the specific value of an urban household’s per capita income with that of a rural household, which is similar to the indicator used by Madison [67]. The GDP growth rate represents the economic growth (EG) variable. The nonrural fixed asset investment growth rate represents the urbanization (UR) variable, which is similar to the indicator used by Shang et al. [68]. Due to the long time horizon, inflation adjustments to the data are required for the reliability of the empirical results. Quarterly inflation data from NBS are used to obtain the real values of the abovementioned variables. The M2 growth rate represents the monetary policy (MP)
variable due to China’s central bank using a quantity-based monetary policy [11]. Table 1 presents the specifics of descriptive statistics for all variables belonging to our model.

Table 1. Date descriptive statistics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP</td>
<td>0.0348</td>
<td>0.0146</td>
<td>0.0084</td>
<td>0.0995</td>
<td>1.5544</td>
<td>7.4454</td>
</tr>
<tr>
<td>UR</td>
<td>0.1889</td>
<td>0.1097</td>
<td>−0.3317</td>
<td>0.4539</td>
<td>0.4539</td>
<td>8.5182</td>
</tr>
<tr>
<td>II</td>
<td>2.7901</td>
<td>0.1982</td>
<td>2.4192</td>
<td>3.4887</td>
<td>0.7532</td>
<td>3.8577</td>
</tr>
<tr>
<td>EG</td>
<td>0.0366</td>
<td>0.0207</td>
<td>−0.0526</td>
<td>0.1429</td>
<td>0.7918</td>
<td>14.003</td>
</tr>
</tbody>
</table>

This study utilizes the augmented Dickey–Fuller (ADF) test to detect the variables’ data series stationarity. As reported in Table 2, the results of the ADF test reveal that every variable is stationary. Therefore, these variables can be used for our paper’s TVP-VAR model and ensure that the empirical estimation results based on the above data are valid.

Table 2. Data unit root test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test Type (C,T,K)</th>
<th>ADF Statistic</th>
<th>5% Critical Value</th>
<th>Prob.</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP</td>
<td>(C,T,0)</td>
<td>−6.6939</td>
<td>−3.4684</td>
<td>0.0000</td>
<td>stable</td>
</tr>
<tr>
<td>UR</td>
<td>(C,T,1)</td>
<td>−7.7469</td>
<td>−3.4692</td>
<td>0.0000</td>
<td>stable</td>
</tr>
<tr>
<td>II</td>
<td>(C,T,0)</td>
<td>−3.5489</td>
<td>−3.4684</td>
<td>0.0412</td>
<td>stable</td>
</tr>
<tr>
<td>EG</td>
<td>(C,T,0)</td>
<td>−10.1983</td>
<td>−3.4684</td>
<td>0.0000</td>
<td>stable</td>
</tr>
</tbody>
</table>

Notes: The letters C, T, and K represent, respectively, the intercept, trend, and lag periods of the ADF test in the test type column.

4. Empirical Results and Discussion

We construct a 4-variable TVP-VAR model that includes MP, UR, II, and EG. The variables of the model are ordered as $y_t = (MP_t, UR_t, II_t, EG_t)$. Following the beginning burn-in period aimed at removing the reliance of the simulation chain upon its starting values, the joint posterior density will converge to stationary. A correctly deduced and executed MCMC algorithm will then produce the samples. We conduct 20,000 MCMC samplings and burn-in the very first 2000 initial subsamples.

4.1. Parameter Estimation

First, we conducted diagnostic tests for convergence and efficiency. Table 3 provides the specific estimated values for parameters with time-varying properties of the TVP-VAR model in this study, including posterior means, mean square error, 95% credible intervals, the Geweke statistics, and the inefficiency factors. As we can see, all of the parameters’ mean square errors are quite small, and the mean values of the posterior distribution all lie between the upper 95% confidence limit and the lower 95% confidence limit. This indicates a high degree of confidence in the estimated parameters of the model. The Geweke convergence diagnostics statistic values are all below 1.96 (the maximum value is 0.846), which suggests that for every parameter, the alternative hypothesis of the estimates of the model parameter are nonconverging to the posterior probability distribution, which is rejected at the 5% significance level [69]. We also find that the inefficiency coefficients are all below 100 (the maximum value is 98.53), which means that at least approximately 307 uncorrelated and valid samples were obtained in 20,000 samples, indicating that the samples obtained in this sampling are sufficient to meet the requirements for statistical inference [70].

Further model efficiency tests conducted are illustrated in Figure 1, where the panels in the top row are the sample serial correlation functions, the panels in the middle row are the sample stochastic realization trajectories, and the panels in the bottom row are the posterior densities of parameter estimated values. After excluding the samples of the burn-in period, the serial correlation functions of the remaining samples rapidly drop and only maintain a small fluctuation near the zero level, which indicates that the autocorrelation of
the data samples used in the model is low. The sample stochastic realization trajectories are largely steady, suggesting that sample generation with the MCMC algorithm is robust. In addition, the posterior densities show a single-peaked pattern, pointing to the efficiency of simulating the posterior distribution of parameters.

Table 3. Estimation values of parameters in the TVP-VAR Model.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>MSEs.</th>
<th>95%L</th>
<th>95%U</th>
<th>Geweke</th>
<th>Inef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\Sigma_{\phi})_1</td>
<td>0.0229</td>
<td>0.0027</td>
<td>0.0184</td>
<td>0.0288</td>
<td>0.743</td>
<td>4.35</td>
</tr>
<tr>
<td>(\Sigma_{\phi})_2</td>
<td>0.0218</td>
<td>0.0023</td>
<td>0.0178</td>
<td>0.0270</td>
<td>0.094</td>
<td>3.77</td>
</tr>
<tr>
<td>(\Sigma_{\phi})_1</td>
<td>0.0829</td>
<td>0.0372</td>
<td>0.0417</td>
<td>0.1760</td>
<td>0.704</td>
<td>38.69</td>
</tr>
<tr>
<td>(\Sigma_{\phi})_2</td>
<td>0.0862</td>
<td>0.0380</td>
<td>0.0425</td>
<td>0.1762</td>
<td>0.846</td>
<td>39.93</td>
</tr>
<tr>
<td>(\Sigma_{\phi})_1</td>
<td>0.4326</td>
<td>0.2114</td>
<td>0.1358</td>
<td>0.9759</td>
<td>0.515</td>
<td>98.53</td>
</tr>
<tr>
<td>(\Sigma_{\phi})_2</td>
<td>0.5741</td>
<td>0.1575</td>
<td>0.3271</td>
<td>0.9394</td>
<td>0.461</td>
<td>33.03</td>
</tr>
</tbody>
</table>

Notes: Mean, MSEs., 95%L, 95%U, Geweke, and Inef. represent the posterior means, mean square errors, lower limit of the 95% confidence interval, upper limit of the 95% confidence interval, Geweke convergence diagnostic statistics, and inefficiency factors, respectively.

Figure 1. Estimation results of parameters in the TVP-VAR Model. Notes: In the panels of the top row, the vertical axes are the sample serial correlation functions, and the horizontal axes are the number of iterations. In the panels of the middle row, the vertical axes are the sample stochastic realizations, and the horizontal axes are the number of iterations. In the panels of the bottom row, the vertical axes are the probability density, and the horizontal axes are the sample value. Sources: Raw data are from the NBS and the PBC, and the graph was drawn by the authors.

These results suggest that the estimation using the MCMC algorithm is robust, implying that our TVP-VAR model’s initial setting is ideal, and the posterior draws that we obtained are efficient.

Next, we will discuss and validate the research hypotheses of our paper by describing and analyzing the impulse responses (IRs) generated by our TVP-VAR model. To comprehensively reflect the dynamic effect, we draw two different IRs graphs. The time horizons graphs, as shown in Panel a of the figures, show the size of IRs to a positive shock for different time horizons: 4 (short-term), 8 (medium-term), and 12 (long-term) periods ahead. The timepoint graphs, as shown in Panel b of the figures, show the size of IRs to a positive shock at three critical timepoints for the macroeconomics of China: the SARS pandemic (Q1 2003), the Global Financial Crisis (Q3 2008), and the COVID-19 pandemic (Q1 2020). The SARS pandemic occurred in the spring of 2003 and was the first pandemic of the 21st century. It severely and adversely affected economic activities in China at that
time. The Global Financial Crisis started to spread to China in the fall of 2008, causing an overall negative impact on foreign trade, investment, and consumption. The COVID-19 pandemic outbreak in early 2020 severely disrupted the world economy, and the global economy has still not fully emerged from the shadow of the pandemic.

4.2. The Time-Varying Effects of Urban–Rural Income Inequality on Economic Growth

Figure 2 shows the IRs of EG to II. As shown in the time horizons graph, the IRs of EG to II have significant time-varying characteristics. More specifically, the IRs for 4, 8, and 12 periods ahead are positive before 2013, in which the impulse response (IR) for 12 periods ahead is most significant and its maximum value is in 2009 (0.004). However, the IRs turn negative after 2013. In particular, the IR for 12 periods ahead has the largest variation and reaches its maximum value in 2019 (−0.004). In brief, the IRs of EG to II are positive until 2013 but show a gradually decreasing trend and stabilize at negative values after 2018. As shown in the timepoints graph, the IRs of EG to II at the three important timepoints show a clear difference in trends. More precisely, the IRs at 2003Q1 (2003), 2008Q3 (2008), and 2020Q1 (2020) are initially negative. The IR in 2003 gradually rises and remains near zero after period 4. In the meantime, the IR in 2008 keeps rising after period 4, while the IR in 2020 keeps falling. In brief, at every timepoint, the IRs of EG to II are negative until period 4. From then on, the trends diverge across the IRs.

![Figure 2. Time-varying impulse responses of EG to II. Sources: Raw data are from the NBS and the PBC, and the graphs were drawn by the authors. (a) Time horizons graph; (b) timepoints graph.](image-url)

The empirical results suggest that urban–rural income inequality effectively promoted overall economic growth between 2002 and 2013 in China, while the effect has turned negative since 2013. This finding is clearly distinct from previous studies on the effect of urban–rural income inequality on economic growth in China [24–26], which generally argue that the effect is negative. In contrast, our finding captures the time-varying characteristics of the effect; that is, while the effect becomes negative in the later stages, the effect is positive in the early years. The reason for the empirical results is that urban–rural income inequality has both a positive incentive effect and a negative market-distorting effect on economic growth, with the incentive effect dominating in the early years and the market-distorting effect dominating in the later stages in China. More specifically, in the early years, the income inequality between urban and rural incentivized people to work, innovate, save, and invest in behaviors that would be more rewarding. At the same time, these good behaviors have contributed to economic growth [71]. Thus, with the demise of egalitarianism, the incentive of income inequality between urban and rural areas had a significant promoting effect on economic growth when China was in transition. Even during the Global Financial Crisis of 2008, the income inequality between urban and
rural areas effectively promoted China’s economic growth. However, urban–rural income inequality has become increasingly serious as China has achieved greater economic success. As mentioned earlier, if urban–rural income inequality persists or even widens, sustainable economic growth will not be achieved because the market distortions caused by inequality will keep resources from being used in the most efficient way. The above empirical results suggest that the market-distorting effect of inequality was already neck-and-neck with the incentive effect in 2013, and the negative effect was gradually strengthening. By the time the COVID-19 pandemic broke out in early 2020, urban–rural income inequality was seriously undermining China’s economic growth. What makes this even more worrisome is that income inequality levels grow gradually in the medium to long term after pandemics [72]. The COVID-19 pandemic may not be an exception. Not only did it lead to the worst world economic recession since the Great Depression, with more than 90% of countries experiencing output contraction, but households with lower economic status and employment in the informal economy were disproportionately adversely affected by job loss from mobility and economic activity restrictions implemented to reduce the health risks of the COVID-19 pandemic [73]. In this context, China’s urban–rural income disparity is likely to deteriorate further, and sustainable economic growth is thus in hidden danger. Faced with such a critical situation, policy authorities need to take measures to mitigate urban–rural income inequality while ensuring economic growth.

In summary, the empirical results of our paper validate Hypothesis 1: The effect of urban–rural income inequality on China’s economic growth has obvious time-varying characteristics. During the earlier period, inequality effectively contributed to economic growth, but the positive effect gradually declined and finally became negative. At present, urban–rural income inequality in China seriously and adversely affects the sustainability of economic growth.

4.3. The Time-Varying Effects of Urbanization on Urban–Rural Income Inequality and Economic Growth

Figure 3 shows the IRs of II to UR. As shown in the time horizons graph, the IRs of II to UR remain stable in direction but fluctuate in intensity. More specifically, the IRs are initially significantly negative for 4, 8, and 12 periods ahead. Then, these intensities gradually strengthen and reach the maximum value in 2010 (−0.005). After that, the IRs gradually wane in intensity until 2016. To date, the IRs have tended to stabilize at a negative value (−0.003). In brief, the IRs of II to UR are always negative, although they fluctuated and then stabilized after 2016. As shown in the timepoints graph, the IRs of II to UR at the three timepoints are largely consistent in trend, differing only in specific values. More specifically, the IRs in 2003, 2008, and 2020 are initially mostly positive but quickly turn negative and reach the maximum value (−0.005). Then, they remain stable after period 4. In brief, the IRs of II to UR are negative after period 1 at each timepoint, differing by the strongest IR in 2008.

The empirical results suggest that increasing urbanization effectively narrowed the income disparity between urban and rural areas for the short and medium–long term during the period between 2002 and 2020 in China. This finding is similar to the studies of Wang et al. [42], Hong and Zhang [43], and Kanbur and Zhuang [74]. However, in contrast, our empirical results not only find that urbanization has a mitigating effect on urban–rural income inequality in China, but also find that the effect changes over time. This time variation arises because the positive spillover effect of cities is much weaker during economic recessions. Specifically, as mentioned earlier, positive urban spillovers to rural areas and labor migration make urbanization effective in lowering the level of urban–rural income inequality. It needs to be highlighted in particular that economic crises have a significant adverse effect on migrant labor, and this is also true for rural migrants in China. The Global Financial Crisis of 2008 halted production in factories across China, and rural migrants in urban areas were hit hard with very high unemployment rates [75]. Fired migrant workers had no choice but to go back to rural areas and work in low-paying
agriculture again. Under such circumstances, the spillover effect of urban areas is greatly diminished, and urbanization no longer reduces urban–rural income inequality as strongly as before; thus, as the empirical results show, the mitigating effect of urbanization on urban–rural income inequality was significantly diminished at that time. Later, as the economy emerged from the shadow of the crisis, the effect gradually returned to normal levels. It cannot be denied that the effect of urbanization in China over recent decades on urban–rural income inequality changed only in intensity due to the dramatic economic fluctuations that occurred at the time, and the direction of the mitigating effect has not changed.

Figure 3. Time-varying impulse responses of II to UR. Sources: Raw data are from the NBS and the PBC, and the graphs were drawn by the authors. (a) Time horizons graph; (b) timepoints graph.

Figure 4 shows the IRs of EG to UR. As shown in the time horizons graph, the IRs of EG to UR have significant time-varying characteristics. More specifically, the IR for 4 periods ahead is significantly negative and reaches the maximum value (−0.0005) before 2010, while the IRs for 8 and 12 periods ahead stay at the zero level. Then, the IRs turn positive and gradually strengthen, especially the IR for 4 periods ahead, which reaches its maximum value (0.002) in 2015. In brief, the IRs of EG to UR are all significantly positive after 2012, with the most dramatic change being the IR for 4 periods ahead, which not only turns from negative to positive but also strengthens in intensity. As shown in the timepoints graph, the IRs of EG to UR at the three important timepoints show a clear difference in trend. More precisely, the IR in 2020 is initially positive and reaches the maximum value (0.005). Then, it gradually decreases in intensity and stabilizes near the value of zero after period 8. The IRs in 2003 and 2008 are initially negative and reach the maximum value (−0.001), and then gradually increase and stabilize near zero after period 10. In brief, the IRs of EG to UR stay around zero after period 8 at every timepoint, differing only with the IR in 2020, which is initially positive.

The empirical evidence suggests that the increase in the degree of urbanization did not contribute to China’s economic growth from 2002 to 2010. In contrast, the effect becomes positive after 2010, especially the stimulating effect in the short term, which is significant. This finding differs from a previous study, which argued that urbanization has a positive effect on China’s economic growth [38]. Our paper finds that the effect is time-varying and that it is not always positive. This time-varying nature arises because of the small size of cities in the early years of modern China, and the agglomeration effect of urban areas does not work well. Specifically, first, as we have analyzed before, urbanization can contribute to economic growth due to agglomeration effects, scale effects, and productivity advances. However, to our surprise, the effect was not positive in the earlier period in China and even had a negative effect in the short term. The cause of this anomaly lies in the fact that China’s early urbanization strategy focused on developing small and medium-sized cities, which resulted in cities expanding faster in size than in population growth, resulting in too
few large cities and too many small ones. According to international standards, China’s city sizes were generally smaller at the time, and there was a lack of large cities for millions of people in particular [76]. A lack of urban concentration has serious consequences for developing countries. Economic growth will be hindered if urban concentration falls below a certain threshold [77]. Against this background, there are not enough jobs to be acquired in cities, and a great amount of surplus rural labor thus remains in rural areas. Then, the industry structure cannot be upgraded normally, and the agglomeration effect of urban areas is not well utilized. The efficiency of the economy thus suffers a great loss [78]. To solve this problem, the Chinese government has started to implement corresponding adjustment policies and begun to introduce the New-Type Urbanization strategy in 2014, which emphasizes human-centered projects and coordinates the expansion of large cities to improve the overall quality of urbanization. In fact, urbanization has had a considerable beneficial influence on China’s overall economic growth since 2012. Today, urbanization policy is an important economic management tool for China due to its significant short-term stimulus effect.

In summary, the empirical results validate Hypothesis 2: Urbanization can promote economic growth while reducing China’s urban–rural income inequality levels, and its effects are time-varying. Although urbanization did not promote China’s economic growth well during its early years due to the lopsided development of cities, it now can beneficially influence overall economic growth. The stimulating effect is particularly significant in the short term. In addition, it needs to be emphasized that urbanization always has significant mitigating effects on urban–rural income inequality.

4.4. The Time-Varying Effects of Monetary Policy on Urban–Rural Income Inequality and Economic Growth

Figure 5 shows the IRs of II to MP. As shown in the time horizons graph, the IRs of II to MP remain stable in direction and strengthen in intensity. More specifically, the IRs for 4, 8, and 12 periods ahead are positive, and the IR for 4 periods ahead is most significant before 2008. However, after that, the intensity of the IRs for 8 and 12 periods ahead increases rapidly. In particular, the IR for 12 periods ahead has the largest variation and reaches its maximum value (0.02) in 2018. In brief, the IRs of II to MP are always positive, and these intensities increased rapidly after 2008, especially the enhancement of the IR for 12 periods ahead, which is the most dramatic. As shown in the timepoints graph, the IRs of II to MP at the three timepoints are largely consistent initially but diverge significantly in later years. More specifically, the IRs in 2003, 2008, and 2020 are all positive at the beginning. The IRs in 2003 and 2008 decrease immediately and stabilize after reaching the maximum value.
(0.005) in period 1, but the IR in 2020 continuously increases. In brief, the IRs of II to MP are positive at every timepoint, with the difference that the IR in 2020 increases after period 2.

The empirical findings imply that China’s easy monetary policy further expanded the income disparity between urban and rural areas. This finding is similar to the studies of Taghizadeh-Hesary et al. [59] and Liosi and Spyrou [79], which argue that easy monetary policy worsens income inequality levels. However, unlike previous studies, we find that the effect of monetary policy on the urban–rural income disparity in China has a time-varying feature. The intensity of the effect increases steeply after 2014, and the long-term effect is the most significant. The reason for this change is the evolution of the income structure of urban and rural households in China, with urban household property income more likely to benefit from an easy monetary policy. Specifically, monetary policy can have an effect on income by acting on wages and assets. In terms of wages, easy monetary policy lowers the real interest rate to reduce unemployment and effectively exert upward pressure on salaries. In terms of assets, as the money supply increases, the prices of stocks, bonds, and real estate subsequently rise, which increases property income. Unfortunately, however, urban households have significantly higher wages and property incomes, both in absolute terms and composition ratios, than rural households. Thus, China’s easy monetary policy further worsens the urban–rural income disparity. In addition, rural households are more vulnerable to inflationary shocks than urban households in China. First, as mentioned above, most of their income (wages, salaries, and operations) is usually defined in nominal terms, and the real value decreases in a high inflation period. Second, China’s central bank does not have a strict inflation limit, and, as a developing country, its monetary policy is aimed at ensuring economic growth [11]. More disturbingly, the role of easy monetary policy during the SARS pandemic in 2003 in worsening urban–rural income inequality fades over time. However, by the time of the COVID-19 pandemic in 2020, the long-term effect of this role is very large and shows a tendency to increase. From the perspective of urban–rural income inequality, easy monetary policy may no longer be an ideal economic management tool because its effect of worsening inequality is not only significant but also persistent.

Figure 5 shows the IRs of II to MP. As shown in the time horizons graph, the IRs of EG to II have significant time-varying characteristics. More specifically, the IRs for 4, 8, and 12 periods ahead are positive at the beginning, and the IR for 4 periods ahead reaches the maximum value (0.0015) in 2014. In particular, the IR for 12 periods ahead turns negative after 2018. In brief, the IRs of EG to MP are all initially positive. However, the IRs for 8 and 12 periods ahead turn negative in the later stage. As shown in the timepoints graph, the IRs of EG to MP at the three timepoints have a consistent trend initially but diverge in the later
While the stimulus achieved immediate results at the time, continued monetary stimulus weak or an economic recession occurs, easy monetary policy can stimulate the economy policy, inefficient investment projects will survive or even be encouraged. In this context, periods. More specifically, the IRs in 2003, 2008, and 2020 reach the maximum value (0.002) in period 2. Then, the IRs gradually decrease and stabilize. The IR in 2020 turns negative after period 8. In brief, the IRs of EG to MP in 2003 and 2008 always remain positive, while the IR in 2020 does not.

Figure 6. Time-varying impulse responses of EG to MP. Sources: Raw data are from the NBS and the PBC, and the graphs were drawn by the authors. (a) Time horizons graph; (b) timepoints graph.

The empirical results suggest that an easy monetary policy can contribute to economic growth in China to some extent. In particular, the short-term stimulus of monetary policy is the strongest. This finding is similar to the studies of Fernald et al. [54] and Wen et al. [55]. However, unlike previous studies, we find that the effect is time-varying. Specifically, even though China’s easy monetary policy still promotes economic growth in the short term, it has a detrimental effect in the long term after 2018. This result arises because excessive reliance on easy monetary policy to stimulate economic growth can have adverse effects on productivity progress. More specifically, monetary policy, as an important economic management tool in China, can influence economic growth. When economic growth is weak or an economic recession occurs, easy monetary policy can stimulate the economy by increasing the total amount of money or lowering interest rates. First, lower interest rates can stimulate the investment behavior of enterprises. Second, sufficient liquidity can boost the consumption of households. Third, a lower exchange rate can improve the competitiveness of export goods. Thus, it can increase aggregate supply and demand by acting on both domestic and international markets and then promoting economic growth. However, while monetary policy has a significant boosting influence in the short term, the effect diminishes over time. During the Global Financial Crisis of 2008, China implemented massive monetary stimulus measures to ensure steady economic growth. While the stimulus achieved immediate results at the time, continued monetary stimulus became ineffective over time and eventually even undermined long-term economic growth. In fact, economic fluctuations are a process of clearing unprofitable investment projects [80], and creative destruction is necessary for productivity to progress. If the interest rate in the market is at its natural level, then inefficient investment projects will be eliminated. In contrast, if the interest rate is artificially below the natural level due to an easy monetary policy, inefficient investment projects will survive or even be encouraged. In this context, limited capital is restrained from investment in more efficient projects, thereby undermining long-term economic growth. At present, the short-term stimulus to economic growth from monetary policy remains significant in the context of the COVID-19 pandemic. However, easy monetary policy is not conducive to China’s economic growth in the long term. Monetary authorities need to make tradeoffs, not only between the long-term and short-term effects but also between the aforementioned urban–rural income inequality and overall economic growth.
In summary, the empirical results validate Hypothesis 3: Easy monetary policy has contributed to economic growth in China, but it has also worsened urban–rural income inequality. First, easy monetary policy worsens urban–rural income inequality, and the intensity is increasing constantly, especially in the long term. Moreover, monetary policy has a mostly short-term stimulating influence on overall economic growth, which diminishes with time. The easy monetary policy, in particular, even undermines China’s long-term overall economic growth after 2019.

4.5. Policy Recommendations

Based on the empirical results above, we propose several specific policy recommendations. First, Chinese policy authorities must take measures to solve the problem of urban–rural income inequality. The reason is that, according to our empirical results, the current urban–rural income inequality has severely and adversely affected sustainable economic growth in China. Although, as can be seen in Figure 7, China’s urban–rural income inequality has declined in recent years compared to its historical high, the disparity remains relatively wide overall. Therefore, in order to achieve sustainable economic growth, the urban–rural income disparity must be reduced through policy rebalancing.

Second, China should make proactive urbanization policies an important part of policy rebalancing. According to the empirical results above, the current urbanization in China is not only effective in mitigating urban–rural income inequality, but also in promoting economic growth. However, as Figure 8 shows, China’s urbanization level is still lagging behind. It lags significantly behind not only developed economies, such as the United States and Japan, but also developing economies such as Brazil and economies such as Russia that have undergone similar economic transitions. The reason for the lag is due to the strict household registration system and the lack of coordination between the development of large and small cities in China. Thus, we suggest that more proactive urbanization policies should be adopted. Specifically, on the one hand, freer urban–rural labor migration should be promoted by reforming the strict household registration system. On the other
hand, the spillover effects of large cities should be more fully exploited by relaxing city size restrictions.

Figure 8. Urbanization in China and selected other countries: 1978–2020. Sources: Raw data are from the World Bank database, and the graph was drawn by the authors.

Third, China should make prudent monetary policies an important part of policy rebalancing. According to the empirical results above, although China’s easy monetary policy has a stimulating effect in the short term, it is not significant or even harmful to economic growth in the long term. More importantly, due to the huge difference between urban and rural household income composition (as shown in Figure 9), the easy monetary policy will worsen China’s urban–rural income inequality and create hidden dangers for sustainable economic development. Currently, in response to the negative shock of the COVID-19 pandemic, China’s central bank has restarted its easy monetary policy. However, we suggest that the monetary authority should optimize its monetary policy framework, reasonably control the growth of money supply, and adopt more prudent monetary policies to prevent further a worsening of urban–rural income inequality due to over-reliance on easy policies, thus ensuring the sustainability of economic growth.

Finally, developing economies need to take proactive measures to prevent severe and worsening income inequality in the process of economic growth. China’s historical experience is instructive for other developing economies at a similar stage of development. According to the empirical results above, moderate income inequality brings benefits to economic growth; however, severe income inequality does just the opposite. Prevention is better than cure. In the process of rapid economic development, policymakers need to enhance policy coordination to both respond effectively to negative shocks to growth and prevent worsening income inequality. Specifically, based on China’s experience, the government should maintain prudent monetary policies and proactive urbanization policies, thereby ensuring the sustainability of growth.
Third, China should make prudent monetary policies an important part of policy rebalancing. According to the empirical results above, although China’s easy monetary policy has a stimulating effect in the short term, it is not significant or even harmful to economic growth in the long term. More importantly, due to the huge difference between urban and rural household income composition (as shown in Figure 9), the easy monetary policy will worsen China’s urban–rural income inequality and create hidden dangers for sustainable economic development. Currently, in response to the negative shock of the COVID-19 pandemic, China’s central bank has restarted its easy monetary policy. However, we suggest that the monetary authority should optimize its monetary policy framework, reasonably control the growth of money supply, and adopt more prudent monetary policies to prevent further worsening of urban–rural income inequality due to over-reliance on easy policies, thus ensuring the sustainability of economic growth.

4.6. Strengths, Limitations, and Further Research

First, unlike previous studies, our article finds that: (1) Urban–rural income inequality in China promotes economic growth in the early years, but the effect becomes negative in the later stages. (2) Urbanization in China is effective in mitigating urban–rural income inequality, but the effect becomes weaker during the economic recessions. Urbanization in China does not promote economic growth in the early years, but it is effective in stimulating economic growth in the later stages. (3) The worsening effect of the easy monetary policy in China on urban–rural income inequality is becoming stronger over time. Although China’s easy monetary policy promotes economic growth in the early years, it has a negative effect on economic growth at later stages. In addition, based on the empirical results, we propose specific policy rebalancing options that can reconcile urban–rural income equity and sustainable economic growth, including proactive urbanization policies and prudent monetary policies.

At the same time, it is necessary to note that our study has some limitations. First, limited by data availability, the empirical data sample for our study begins in 2002. Although our study has captured the time-varying nature of the effects, effects prior to 2002 are not known to us. Second, our study finds that the effect of urban–rural income inequality on China’s economic growth is dynamic. This implies that there may be an optimal level of income inequality. At the optimal level of income inequality, economic growth can be promoted through incentive effects and the sustainability of growth will not be adversely affected by market distortion effects. However, our study has not yet delved into the optimal level of income inequality. Third, our study focuses on how the effects change over time; however, the regional differences in the effects have not been investigated. Specifically, the urbanization rate in China’s inland areas significantly lags behind that in coastal areas. We have not investigated the differences in the effects of urbanization on urban–rural income inequality and economic growth between inland and coastal regions. Fourth, our study focuses on the effects of China’s easy monetary policy on urban–rural income inequality.
and economic growth. This monetary policy is conventional monetary policy; however, the effect of unconventional monetary policy has not been investigated by us.

Based on the above analysis, our study can be a preamble to conducting further research. Specifically, first, an in-depth study can be conducted on the optimal level of income inequality. At that level, the economy maintains stable growth without potential pitfalls adversely affecting its sustainability. Second, further studies can be conducted in terms of the regional differences of the effects. For example, does urban–rural income inequality affect economic growth equally between coastal and inland areas of China? Are there differences in the effects of urbanization and monetary policy on urban–rural income inequality and economic growth between different regions? This type of research can help further improve the effectiveness of policy rebalancing. Third, further research can be conducted from the perspective of unconventional monetary policy. China’s central bank has now started to implement unconventional monetary policies, including forward guidance, to regulate the economy. In this context, it is necessary to investigate the specific effects of unconventional monetary policy on urban–rural income inequality and economic growth in China.

5. Conclusions

This paper adds to the literature regarding the effects of China’s urban–rural income inequality on economic growth in the context of urbanization and monetary policy. More importantly, we investigate whether these effects are time-varying. On this basis, we suggest feasible policy rebalancing for developing countries, including China.

First, China’s urban–rural income inequality possesses a time-varying effect on economic growth. Although the income inequality between urban and rural areas promoted overall economic growth in earlier years, this effect has now turned negative. If this market distortion can be addressed, it will help make the economy more efficient and achieve sustainable growth. Second, China’s current urbanization can both promote economic growth and mitigate urban–rural income inequality. While easy monetary policy has contributed to economic growth to some extent, it has also worsened urban–rural income inequality. Third, to ensure the sustainability of economic growth, China needs to engage in policy rebalancing to address urban–rural income inequality. In this context, proactive urbanization policy and prudent monetary policy may be an ideal policy combination, as it can both effectively promote economic growth while significantly moderating the worrisome urban–rural income inequality.

In fact, China’s severe urban–rural income inequality problem and its serious threat to economic growth have attracted the government’s attention. In recent years, China’s policy authorities have emphasized the need to adopt the economic strategy of "prosperity for all" or "shared development". This strategy is a far cry from the egalitarianism of the pre-reform era. It calls for a good relationship between efficiency and equity. Economic growth should be accompanied by fairness and equity, and the two should be coordinated and balanced. Neither widespread poverty should emerge due to excessive concern for equity nor severe income disparity due to excessive concern for growth.

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