

China's ongoing rural to urban transformation benefits the population but is not evenly spread

Corresponding Author: Professor Le Yu

Version 0:

Decision Letter:

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Dear Professor Yu,

First of all, please allow me to apologise for the delay in sending a decision on your manuscript titled "China's coupling rural-urban transformation is reducing its urban and rural well-being inequities". It has now been seen by 2 reviewers, whose comments are appended below. You will see that they find your work of some potential interest. However, they have raised quite substantial concerns that must be addressed. In light of these comments, we cannot accept the manuscript for publication, but would be interested in considering a revised version that fully addresses these serious concerns.

We hope you will find the reviewers' comments useful as you decide how to proceed. Should additional work allow you to

- address these criticisms (that is, either to incorporate the suggestions or provide a compelling argument why the point made by the reviewer is not valid or relevant to the editorial threshold as outlined below)

AND

- meet our editorial thresholds as outlined below,

then we would be happy to look at a revised manuscript.

In the following, we list our minimum requirements for publication.

*****Present novel and firmly supported insights into China's rural-urban transition pattern and response to urban and rural well-being inequities in China**

***** Provide a theoretical foundation and outline your data and methodology at the level of detail that an independent researcher can replicate your research.**

***** Communicate strengths that your methodology offers in examining the complex relationship between urban and rural areas.**

If you choose to take up this option, please either highlight all changes in the manuscript text file, or provide a list of the changes to the manuscript with your responses to the reviewers.

Please bear in mind that we will be reluctant to approach the reviewers again in the absence of substantial revisions.

If the revision process takes significantly longer than three months, we will be happy to reconsider your paper at a later date, as long as nothing similar has been accepted for publication at Communications Earth & Environment or published elsewhere in the meantime.

We are committed to providing a fair and constructive peer-review process. Please do not hesitate to contact us if you wish to discuss the revision in more detail.

Please use the following link to submit your revised manuscript, point-by-point response to the reviewers' comments with a list of your changes to the manuscript text (which should be in a separate document to any cover letter), a tracked-changes

version of the manuscript (as a PDF file) and any completed checklist:

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Please do not hesitate to contact us if you have any questions or would like to discuss the required revisions further. Thank you for the opportunity to review your work.

Best regards,

Ida N. S. Djenontin, PhD
Editorial Board Member
Communications Earth & Environment
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EDITORIAL POLICIES AND FORMAT

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Editorial Policy Policy requirements
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For your information, you can find some guidance regarding format requirements summarized on the following checklist: (https://www.nature.com/documents/commsj-phys-style-formatting-checklist-article.pdf) and formatting guide (https://www.nature.com/documents/commsj-phys-style-formatting-guide-accept.pdf).

Reviewer #1

The methodology proposed in this manuscript is straightforward and conceptually reasonable. Industrialization, land, and population are three very important dimensions of urbanization, and RUTD and CD seem to be useful metrics to measure the "balance" between those dimensions.

However, the spatiotemporal patterns of urbanization in China revealed by RUTD and CD are, as presented in this manuscript, not that different from those patterns found in geographic economics / macroeconomics. In the discussion and figure 5, policies like "reform and opening-up", "Large-scale Development of Western China", "Re-vitalizing Northeast China", "Rise of Central China" have been cited as the reasons behind the spatiotemporal patterns of RUTD and CD found in the paper. But these mechanisms are also the same mechanisms discussed in geographic economics / macroeconomics literature. Therefore, based on the current interpretation of the results presented here, it is not very clear what are the new information added by constructing two new metrics of RUTD and CD, and clustering them into 6 groups.

Overall, my biggest concern about this paper is that it does not clearly explain the added values of the new methods in their interpretations of the results, other than confirming spatiotemporal patterns of urbanization already known in the literature.

REVIEWER COMMENTS:

Reviewer #2 (Remarks to the Author):

The article provides an investigation into China's rural-urban transformation, considering the Rural-Urban Transformation Degree (RUTD), coupling degree, and spatiotemporal dynamics. However, it still lacks elucidation on evaluation indicators, theoretical foundations, and language refinement, highlighting several areas for improvement :

The article mentions the construction of the Rural-Urban Transformation Degree (RUTD) evaluation index system, which mainly considers multifaceted urbanization processes such as land, population, and industry. However, the author does not provide detailed information on the selection criteria for these evaluation indicators and their relevance to well-being.

The relationship between urban and rural areas is a complex system formed by the interrelation of various factors. It is questionable whether measuring the rural-urban transformation degree solely through corresponding indicators can successfully capture this relationship. The author needs to deeply consider whether the conclusions drawn from quantitative methods are reliable and provide further explanation regarding the theoretical foundation and contribution of this study.

It is important for the author to clarify the theoretical basis for calculating the coupling degree and whether the proposed

mathematical model can truly reveal the interrelationships between different factors.

The language in the article could benefit from further refinement.

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Author Rebuttal letter:

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List of responses to the reviewers's comments

Reviewer #1's/4

Comment 1 The methodology proposed in this manuscript is straightforward and conceptually reasonable. Industrialization, land, and population are three very important dimensions of urbanization, and RUTD and CD seem to be useful metrics to measure the "balance" between those dimensions. However, the spatiotemporal patterns of urbanization in China revealed by RUTD and CD are, as presented in this manuscript, not that different from those patterns found in geographic economics / macroeconomics. In the discussion and figure 5, policies like "reform and opening-up", "Large-scale Development of Western China", "Revitalizing Northeast China", "Rise of Central China" have been cited as the reasons behind the spatiotemporal patterns of RUTD and CD found in the paper. But these mechanisms are also the same mechanisms discussed in geographic economics / macroeconomics literature. Therefore, based on the current interpretation of the results presented here, it is not very clear what are the new information added by constructing two new metrics of RUTD and CD, and clustering them into 6 groups.

Overall, my biggest concern about this paper is that it does not clearly explain the added values of the new methods in their interpretations of the results, other than confirming

spatiotemporal patterns of urbanization already known in the literature.

[Answer 1 : We appreciate your thoughtful review and constructive feedback on our manuscript. I sincerely apologize for the lack of clear clarity in describing the construction process of RUTD and $CD\hat{I}_j$ in the Methods section. In fact, the RUTD is currently a widely adopted indicator by scholars to measure the degree of rural-urban transformation. This extensively used approach simultaneously takes into account the three urbanization tracks, namely, land urbanization (LU), industrial urbanization (EU), and population urbanization (PU). In light of our previous lack of clarity, we first added the relevant references (Lines 431-432) and provided a clearer explanation of the process involved in integrating LU, PU, and EU to construct the RUTD indicator (Lines 433-436). While $CD\hat{I}_j$ is indeed our newly constructed indicator in this paper, it is an indicator that is proposed based on a theory that

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is well-recognized by scholars (Ma et al., 2019). That is, scholars have argued that the three urbanization tracks are considered coupled when the state of the RUT, denoted as point P, falls on line OP0. Conversely, as the line OP deviates further from OP0, the three urbanization tracks become more decoupled. That is, $CD\hat{I}_j$ is merely a mathematical expression of this theory (Lines 471-476) .

Regarding your concern about why the five indicators, including the two outcome variables (RUTD and $CD\hat{I}_j$) and the three cause variables (PU, LU, and EU), are clustered into multiple types, the main reasons are the following. First, even though the two outcome variables are equal among the two regions, the three cause variables might exhibit disparities.

Most importantly, one of the purposes of our paper is to provide a quantitative basis for socially sustainable urban-rural transformation in China based on the estimations.

Nevertheless, we acknowledge that the RUTD and $CD\hat{I}_j$ are continuous variables, posing challenges when formulating concrete policy recommendations. Through the clustering of multiple indicators into distinct types, we can articulate corresponding regulatory pathways for each type. It's noteworthy that the three cause indicators serve as crucial entry points in these regulatory pathways, as elaborated in the third section of the Discussion (Lines 352-401).

In addition, inspired by your comments, we also found that the original manuscript only analyzed the effects of RUTD and $CD\hat{I}_j$ on the urban-rural well-being gap and lacked

analysis of the differences in the response of the urban and rural well-being inequities to different RUTPs. Given this, we supplemented this missing part in the revised manuscript (Line 247-250 Line and Fig. 4 gâi). In addition, to highlight the scientific significance of this study, we incorporated a discussion on the contributions of our research in the Conclusion section. (Lines 417-427).

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Reviewer #2 (Remarks to the Author): The article provides an investigation into China's rural-urban transformation, considering the Rural-Urban Transformation Degree (RUTD), coupling degree, and spatiotemporal dynamics. However, it still lacks elucidation on evaluation indicators, theoretical foundations, and language refinement, highlighting several areas for improvement^{1/4}

Comment 1 ^{1/4} The article mentions the construction of the Rural-Urban Transformation Degree (RUTD) evaluation index system, which mainly considers multifaceted urbanization processes such as land, population, and industry. However, the author does not provide detailed information on the selection criteria for these evaluation indicators and their relevance to well-being.

[Answer 1 : Many thanks for your valuable feedback. I appreciate your observation regarding the need for a more detailed explanation of the criteria for selecting the indicators in the Rural-Urban Transformation Degree (RUTD) assessment framework and their correlation with well-being. In fact, the RUTD measurement method employed in this paper is currently widely adopted by scholars. This extensively used approach simultaneously takes into account the three urbanization tracks, namely, land urbanization (LU), industrial urbanization (EU), and population urbanization (PU). In light of our previous lack of clarity, we first added the relevant references (Lines 431-432) and provided a clearer explanation of the process involved in integrating LU, PU, and EU to construct the RUTD indicator (Lines 433-436). Furthermore, it was also realized that in this paper we also lacked a detailed description of measures for the three urbanization tracks. So, we supplemented a detailed explanation of the meaning of the three indicators and their measurement methods in the Methods (Lines 437-453)ã

Additionally, in the Discussion section of the revised manuscript, we added a detailed interpretation of the mechanisms of the ongoing and coupling rural-urban transformation model in driving socially sustainable urban-rural transformation in China by taking the goal of promoting an equalization of rural and urban well-being (Line 262-302). On the one hand, we explained in detail how the decoupling or asynchrony of the three

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urbanization tracks can affect the urban and rural well-being inequities (Line 263-280). On the other hand, we also interpret that along with the increasing RUTD in the changing socio-economic stage, how the urban and rural well-being inequities may respond (Line 281-298). Finally, to make it easier for the reader to understand, we also drew a diagram of the mechanism (Line 299-302).

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Comment 2: The relationship between urban and rural areas is a complex system formed by the interrelation of various factors. It is questionable whether measuring the rural-urban transformation degree solely through corresponding indicators can successfully capture this relationship. The author needs to deeply consider whether the conclusions drawn from quantitative methods are reliable and provide further explanation regarding the theoretical foundation and contribution of this study.

[Answer 2: Thanks for your valuable feedback. The measure of Rural-Urban Transformation Degree (RUTD) employed in this paper has gained widespread recognition among scholars and is founded on a relatively mature theoretical basis. And it's essential to note that the RUTD measure is not developed by us. Rather, it has been previously utilized in numerous published surveys. Given this, to make this paper more precise in its expression, we added a selection basis of this indicator in the Methods section (Line 431-432). However, as you mentioned, the relationship between urban and rural areas is highly complex, and the measure of urban-rural transformation degree that we have adopted, although widely used, is constructed only for the simplified urban-rural system. This may bring some uncertainties to the results, and we acknowledge this as an aspect to consider and improve in future research (Line 424-427). Besides, following your comments, we elaborated in detail on the theoretical mechanisms of how changes in RUTD and CD_i impact human well-being in the Discussion section (Line 262-302). Additionally, we have included a diagram to visually illustrate this mechanism (Line 299-302). We also

incorporated your suggestions into the Conclusions section to enhance the clarity of the

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contributions of our study (Line 417-424). We believe these modifications strengthen the robustness and clarity of our paper.

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Comment 3: It is important for the author to clarify the theoretical basis for calculating the coupling degree and whether the proposed mathematical model can truly reveal the interrelationships between different factors.

[Answer 3: Many thanks for your comments, indeed in the initial submission, we have not sufficiently demonstrated the theoretical basis for calculating the coupling degree. In fact, the theoretical basis for the coupling degree calculation in this paper is rooted in the consensus in the existing pieces of literature (Ma et al., 2019). That is, scholars have argued that the three urbanization tracks are considered coupled when the state of the RUT, denoted as point P, falls on line OP₀. Conversely, as the line OP deviates further from OP₀, the three urbanization tracks become more decoupled. In addition, this well-recognized theoretical basis has been proven to be effective in revealing interrelationships between these three urbanization tracks in these studies. According to your comments, we added this missing theoretical basis and relevant references in the revised manuscript (Lines 471-476).

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Comment 4: The language in the article could benefit from further refinement.

[Answer 4: In response to this valuable suggestion, we first used ChatGPT to polish the writing to meet the academic style, and improve the spelling, grammar, clarity, concision, and overall readability. Besides, we engaged some co-authors from top international universities to comprehensively enhance the language throughout the paper. All changes have been highlighted in red in the revised manuscript. We believe that these combined efforts have resulted in a substantial improvement in the overall quality of the language used in the manuscript.

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Version 1:

Decision Letter:

Dear Professor Yu,

Your manuscript titled "Addressing inequities in urban and rural well-being through China's ongoing and coupling rural-urban transformation" has now been seen by 2 reviewers, whose comments are appended below. In the light of their advice, especially the critical points from Reviewer #2, we regret to inform you that we cannot publish your manuscript in Communications Earth & Environment.

You will see that the reviewers continue to raise substantive concerns regarding the lack of sufficiently novel and compelling advances in our understanding of rural-urban transformation in China. Taking these points together with the lack of theoretical foundation and methodological clarity, we are unable to conclude that your manuscript is suitable for publication in Communications Earth & Environment.

We are sorry that we cannot be more positive and thank you for the opportunity to consider your work.

Best regards,

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Editorial Board Member
Communications Earth & Environment
orcid.org/0000-0003-0991-5701

Martina Grecequet, PhD
Associate Editor
Communications Earth & Environment
@CommsEarth

Reviewers' comments:

Reviewer #1 (Remarks to the Author):

The revised version has addressed most of my previous concerns. Now the manuscript articulates the meanings and implications of RUTD, CD, and the 6 clusters much better than the previous version. I think the readers now can better understand the contributions this paper make to our knowledge about urbanization in China.

Belows are some minor comments on the figures.

In Fig 1-e and Fig 2-e, normal distributions are fitted for the samples. But here a truncated normal distribution rather than a regular normal distribution should be used. Because RUTD and CD can not be larger than 1 or smaller than 0. So the distributions are truncated at 0 and 1. It doesn't make sense mathematically to have the curves go beyond the theoretical limits.

I am not sure if the heat maps of Fig 1-f and Fig 2-f are the best way to show the information. The orders of provinces on the y-axis have not particular meaning. The contours do not make much sense or convey useful information. Perhaps a time series plots would be better in conveying the information about which provinces have their RUTD or CD changed the most? Plotting all provinces in the same time series graph may be messy. I would recommend only plotting the provinces that have experienced the most prominent changes.

Reviewer #2 (Remarks to the Author):

The authors have made revisions according to the suggestions, but they have still not provided a strong explanation for the theoretical basis of CD. Additionally, most of their references are based on Chinese literature, lacking innovation and an international perspective. The authors have not adequately justified the originality of the article based on the feedback from the first round of reviews, as there are already numerous similar studies available.

Author Rebuttal letter:

Reviewer #1:

Comment 1¼The revised version has addressed most of my previous concerns. Now the manuscript articulates the meanings and implications of RUTD, CD, and the 6 clusters much better than the previous version. I think the readers now can better understand the contributions this paper make to our knowledge about urbanization in China.

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[Answer 1: Thanks for your valuable feedback. Your suggestions this round were indeed something we had previously overlooked in our graphic representation. In response, we performed a truncated normal distribution fit to the samples in Figures 1-e and 2-e to replace the misused regular normal distribution fit (Lines 152-159 and 184-190). In addition, inspired by your comments, we abandoned the use of heat maps in Figures 1-f and 2-f, and instead used graphical maps to show the temporal variation of RUTD and CD at the provincial level in the Supplementary Information (Supplementary Fig. 1 and Fig. 2).
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Reviewer #2:

Comment 1¼The authors have made revisions according to the suggestions, but they have still not provided a strong explanation for the theoretical basis of CD. Additionally, most of their references are based on Chinese literature, lacking innovation and an international

perspective. The authors have not adequately justified the originality of the article based on the feedback from the first round of reviews, as there are already numerous similar studies available.

[Answer 1: Thanks for your comments. Firstly, regarding the theoretical basis of the Coupling Degree (CD), we have taken great care to bolster its conceptual underpinnings in the revised manuscript. The prevailing scholarly consensus suggests that the three urbanization tracks are considered coupled when the state of the RUT, denoted as point P, falls on line OP0 (as shown in Figure 8). At this time, the population urbanization rate, land urbanization rate, and industry urbanization rate of a particular city are equal. Conversely, as the line OP deviates further from OP0, the three urbanization tracks become more decoupled (Lines 476-492). Moreover, it's noteworthy that existing research employing CD models predominantly centers on China. Consequently, the bulk of methodological references in our study emanate from Chinese sources. The generalizability of this model to other countries constitutes a significant uncertainty in our study, necessitating further investigation and enhancement for future research endeavors. We have acknowledged and addressed this concern in our discussion section (Lines 303-306).].

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Version 2:

Decision Letter:

** Please ensure you delete the link to your author home page in this e-mail if you wish to forward it to your coauthors **

Dear Professor Yu,

Your manuscript titled "Addressing inequities in urban and rural well-being through China's ongoing and coupling rural-urban transformation" has now been seen by our reviewers, whose comments appear below. In light of their advice we are delighted to say that we are happy, in principle, to publish a suitably revised version in Communications Earth & Environment under the open access CC BY license (Creative Commons Attribution v4.0 International License).

We therefore invite you to revise your paper one last time to address the remaining editorial concerns. In particular, we request that you discuss the applicability of the coordination degree model beyond China.

At the same time we ask that you edit your manuscript to comply with our format requirements and to maximise the accessibility and therefore the impact of your work.

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We hope to hear from you within two weeks; please let us know if you need more time.

Best regards,

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Martina Grecequet, PhD
Associate Editor
Communications Earth & Environment

REVIEWERS' COMMENTS:

Reviewer #1 (Remarks to the Author):

The authors have addressed all of my comments. I think this manuscript can be accepted for publication now.

Reviewer #2 (Remarks to the Author):

The author has made amendments in response to the concerns raised.

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Author Rebuttal letter:

List of responses to the reviewers's comments

Reviewer #1: The authors have addressed all of my comments. I think this manuscript can be accepted for publication now.

[Answer 1: Thank you very much for your thorough review and constructive feedback. We are pleased to hear that you consider the manuscript suitable for publication following the revisions. Your insights have been invaluable to us throughout this process. We sincerely appreciate your time and effort in reviewing our work.

].

Reviewer #2: The author has made amendments in response to the concerns raised.

[Answer 1: Thank you very much for your thorough review. Your insights have been instrumental in improving the manuscript. We appreciate your time and effort in reviewing our work.

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made.

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