

INCOME GAP, INDEPENDENT INNOVATION AND DOMESTIC VALUE ADDED RATIO OF FIRMS' EXPORT

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ABSTRACT. *Based on the data of China Industry Business Performance, China Customs Trade and China Statistical Yearbook, this paper systematically examines the relationship between income gap, independent innovation and domestic value added ratio (DVAR) of enterprises' exports with empirical analysis method. The results show that there is an inverted u-shaped relationship between the income gap and the enterprises' export DVAR. R&D innovation behavior has a significant moderating effect on the relationship between income gap and export DVAR. Check on the channel of innovation effects on the enterprises' export DVAR finds that intermediary variables are markups and the relative price of intermediate inputs at home and abroad. Therefore, in order to improve the enterprises' export DVAR and gain more benefits from international trade, it is necessary to accelerate the reform of income distribution system, narrow the income gap and further promote the innovative development strategy of enterprises.*

Keywords: Income gap, Export domestic value added ratio, Independent innovation, Global value chain

1. Introduction. In recent years, while China's economy is developing rapidly, it also faces the risk of widening income gap, which seriously restricts the sustainable and stable development of economy. "The top 10% income rose from 27% to 41% of national income between 1978 and 2015, while the bottom 50% share dropped from 27% to 15%" [1]. China's Gini coefficient also rose from 0.317 in 1978 to 0.468 in 2018, exceeding the international warning line of 0.4. Shortage of domestic demand caused by the enlargement of income gap, and structural reforms to boost the supply side, the industrial development of upgrade of the quality, and the efficiency and the division of a country's participation in international trade to obtain the size of the real trade gains all need strong domestic demand, and insufficient domestic demand will reduce the enterprises' investment in research and development innovation, and cut R&D innovation activities, which restricted the enterprises' performance level of ascension.

Zhang et al. [2] believed that the enterprises' export DVAR is an important indicator to measure the real trade gains of a country in the process of participating in international trade. Xu et al. [3] believed that when Chinese enterprises participate in the division of global value chain under the background of the new normal, how to improve the level of their own profit has been the current academic research needs to focus on the topic. As for the exploration of the influencing factors of Chinese enterprises' export DVAR, most are from the perspective of supply [4-6], few studies focus on demand-side analysis, and

ignore the impact of income gap on enterprises' export DVAR. Shortage of domestic demand caused by the income gap enlargement, insufficient domestic demand would reduce the enterprises' investment in R&D innovation and cut R&D innovation activities. Existing research has shown that innovation can significantly enhance the enterprises' foreign trade competitiveness [7], so how does the income inequality affect enterprises' innovation ability, and thus affect the enterprise of real trade gains? The correct assessment of the impact of income gap on enterprises' export DVAR has certain theoretical value and practical significance for promoting Chinese enterprises' participation in global value chain division of labor and the improvement of international competitiveness as well as the transformation and upgrading of export trade.

This research enriches and expands existing research mainly in the following aspects: this research believes that the relationship between income gap and firms' export DVAR is inverted "U" shape, and the important channel of income gap affecting firms' export DVAR is firms' innovation behavior. There is an inverted U-shaped relationship between income gap and firms' innovation behavior, which affects firms' export DVAR through "cost-plus effect" and "relative price effect of imported intermediate goods and domestic intermediate goods".

The work is structured as follows. The following section presents theoretical development and hypotheses formulation. Section 3 describes the method of data collection, the specification of the model and variables used. Section 4 shows and discusses the results. Section 5 presents the concluding remarks.

2. Theoretical Development and Hypotheses. First of all, income gap will have an impact on firms' innovation through two channels of "demand scale effect" and "consumption structure effect" [8], and the impact conclusion depends on the combined effect of the two. Secondly, enterprises' R&D innovation may increase the cost-plus rate [9] and the relative price of imported intermediate products and domestic intermediate products [10,11]. Reference to Kee and Tang [10] research train of thought, the data expression of export DVAR is obtained $DVAR_{ft} = 1 - x_M \frac{1}{mkp_{ft}} \frac{1}{1+(p_t^I/p_t^D)^{k-1}}$, which indicates that the enterprise's export DVAR depends on the cost addition rate (mkp_{ft}) and the relative price of imported intermediate products and domestic intermediate products (p_t^I/p_t^D), the first derivative of the formula mkp_{ft} and p_t^I/p_t^D are $\frac{\partial DVAR_{ft}}{\partial mkp_{ft}} = x_M \frac{1}{mkp_{ft}^2} \frac{1}{1+(p_t^I/p_t^D)^{k-1}} > 0$ and

$\frac{\partial DVAR_{ft}}{\partial (p_t^I/p_t^D)} = (k-1)x_M \frac{1}{mkp_{ft}} \frac{(p_t^I/p_t^D)^{k-2}}{[1+(p_t^I/p_t^D)^{k-1}]^2} > 0$, respectively. According to the above re-

sults, the larger the cost plus ratio (mkp_{ft}) and the relative price of imported intermediate products (p_t^I/p_t^D) are, the larger the enterprise's export DVAR is. Conversely, the smaller the export DVAR is. According to the above theoretical description, income gap acts on enterprises' export DVAR by influencing enterprises' R&D innovation, and the mediating variables of R&D innovation's influence on enterprises' export DVAR are cost-plus rate and relative price of imported intermediate goods and domestic intermediate goods. According to the expression of export DVAR, it can be seen from the decomposition formula that the impact of income gap on enterprises' export DVAR can be decomposed into the effect on cost addition rate and the relative price of imported intermediate goods and domestic intermediate goods, which can be expressed by the identity equation: $\frac{\partial DVAR_{ft}}{\partial gini_{ft}} = \frac{\partial DVAR_{ft}}{\partial mkp_{ft} (p_t^I/p_t^D)} \frac{\partial mkp_{ft} (p_t^I/p_t^D)}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}}$, the $gini_{ft}$ stands for the income gap, and Inn_{ft} stands for the R&D innovation. Therefore, put forward the following hypotheses.

Hypothesis 1: The income gap may affect technological innovation ability through demand scale effect and consumption structure effect, and affect export DVAR through innovation behavior.

Hypothesis 2: The income gap affects enterprises' cost-plus rate and relative prices of intermediate inputs at home and abroad through innovation effect, and then influences enterprises' export DVAR.

“The income gap and the enterprises' markup are inverted U-shaped relationship” [12]. According to the conclusion obtained from the above analysis $\frac{\partial DVAR_{ft}}{\partial mkp_{ft}} > 0$ and the theoretical description, when the income gap does not reach the threshold value, $\frac{\partial mkp_{ft}}{\partial gini_{ft}} > 0$, the further conclusion $\frac{\partial DVAR_{ft}}{\partial gini_{ft}} = \frac{\partial DVAR_{ft}}{\partial mkp_{ft}} \frac{\partial mkp_{ft}}{\partial gini_{ft}} > 0$ can be drawn. When the income gap reaches the threshold value, $\frac{\partial mkp_{ft}}{\partial gini_{ft}} < 0$, the conclusion $\frac{\partial DVAR_{ft}}{\partial gini_{ft}} = \frac{\partial DVAR_{ft}}{\partial mkp_{ft}} \frac{\partial mkp_{ft}}{\partial gini_{ft}} < 0$ can be further drawn.

Li et al. [8], An and Qian [13] all found an inverted U-shaped relationship between income gap and enterprises' R&D innovation, that is, before the income gap reaches the threshold value, the expansion of income gap promotes enterprises' technological innovation; after reaching the threshold value, the enthusiasm of enterprises' R&D and innovation activities decreases with the increase of income gap. Therefore, before the income gap reaches the threshold, the expansion of income gap promotes enterprises' R&D and innovation activities, and the improvement of enterprises' R&D and innovation level is conducive to the expansion of their production range, thus increasing the types of intermediate products available in the domestic market [14,15], namely $\frac{\partial Variety_t^D}{\partial Inn_{ft}} > 0$. Domestic supply of intermediate inputs increase, means that its price p_t^D will decline, and enhance the relative prices of imported intermediates and their down-stream p_t^I/p_t^D [16], that is, $\frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} > 0$, because at this stage the expansion of income gap promotes the enterprise's innovation activities, namely $\frac{Inn_{ft}}{gini_{ft}} > 0$, it can be seen that the expansion of income gap will promote the R&D and innovation activities of enterprises, and then help to improve the relative price of imported intermediate products and domestic intermediate inputs, namely $\frac{\partial(p_t^I/p_t^D)}{\partial gini_{ft}} = \frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} \frac{\partial Variety_t^D}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}} > 0$; after reaching the threshold value, with the increase of income gap, the enthusiasm of enterprises' R&D and innovation activities decreases, thus reducing their production range, and thus reducing the types of intermediate goods available in the domestic market, namely $\frac{\partial Variety_t^D}{\partial Inn_{ft}} < 0$, the decrease in domestic supply of intermediate inputs means that the price p_t^D will rise, thus reducing the relative price of imported intermediate goods and domestic intermediate inputs p_t^I/p_t^D [16], that is $\frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} < 0$. At this stage, the expansion of income gap reduces the enthusiasm of enterprises' R&D and innovation activities, that is $\frac{Inn_{ft}}{gini_{ft}} < 0$, it can be seen that the expansion of income gap will reduce the enthusiasm of enterprises' R&D and innovation activities, and then reduce the relative price of imported intermediate goods and domestic intermediate inputs, that is $\frac{\partial(p_t^I/p_t^D)}{\partial gini_{ft}} = \frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} \frac{\partial Variety_t^D}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}} < 0$. According to the conclusion obtained from the above analysis $\frac{\partial DVAR_{ft}}{\partial(p_t^I/p_t^D)} > 0$ and combined with the above theoretical description analysis, when the income gap does not reach the threshold value, $\frac{\partial(p_t^I/p_t^D)}{\partial gini_{ft}} = \frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} \frac{\partial Variety_t^D}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}} > 0$, the further conclusion can be obtained $\frac{\partial DVAR_{ft}}{\partial gini_{ft}} = \frac{\partial DVAR_{ft}}{\partial(p_t^I/p_t^D)} \frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} \frac{\partial Variety_t^D}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}} > 0$; when the income gap reaches the threshold value, $\frac{\partial(p_t^I/p_t^D)}{\partial gini_{ft}} = \frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} \frac{\partial Variety_t^D}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}} < 0$, the further conclusion can be obtained $\frac{\partial DVAR_{ft}}{\partial gini_{ft}} = \frac{\partial DVAR_{ft}}{\partial(p_t^I/p_t^D)} \frac{\partial(p_t^I/p_t^D)}{\partial Variety_t^D} \frac{\partial Variety_t^D}{\partial Inn_{ft}} \frac{\partial Inn_{ft}}{\partial gini_{ft}} < 0$. Therefore, put forward the following hypothesis.

Hypothesis 3: The income gap has an inverted U-shaped relationship with firms' export DVAR.

3. Method.

3.1. **Model design.** The empirical model of this paper is as follows:

$$DVAR_{fit} = \alpha + \beta \cdot gini_{jt} + \gamma \cdot gini_{jt}^2 + \varpi \cdot mkp_{fit} + \varphi \cdot IMR_{fit} + \theta \cdot X_{fit} + \delta_t + \delta_f + \delta_i + \varepsilon_{fit} \quad (1)$$

The subscript f stands for the firm, j stands for the province, i stands for the industry, and t stands for the year. $DVAR_{fit}$ is the domestic value-added rate of enterprise's export, $gini_{jt}$ is the income gap, mkp_{fit} is the firms' markup, and IMR_{fit} stands for the proportion of imported intermediate products. Since the price of domestic intermediate inputs cannot be obtained, the use ratio of imported intermediate goods IMR_{fit} is used to replace the relative price of imported intermediate goods and domestic intermediate goods p_t^I / p_t^D . When calculating the use ratio of imported intermediate goods IMR_{fit} , it is expressed by the ratio of the total value of imported intermediate goods to the total value of intermediate inputs of enterprises. X_{fit} is the control variable at the enterprise level, including firms' size, age, per capita wage (Vwage), debt ratio (Lev), capital intensity (Cap), and total factor productivity (Tfp). All the data of control variables come from the Database of China Industry Business Performance.

3.2. Measurement of core indicators.

3.2.1. *Export DVAR.* Firms' export DVAR was calculated based on the research methods of Upward et al. [17], Zhang et al. [2], and Kee and Tang [10].

3.2.2. *Income gap.* This paper selects the Gini coefficient of provincial residents' income as the index to measure the income gap, and uses the research methods and ideas of Tian [18] for specific calculation.

3.2.3. *Markup.* This paper uses accounting method to calculate the firms' markup. In specific calculation, the relationship between firms' product price and marginal cost is expressed as follows with reference to the research ideas and methods of Domowitz et al. [19]:

$$\left(\frac{p - c}{p} \right)_{fit} = 1 - \frac{1}{mkp_{fit}} = \left(\frac{va - pr}{va - ncm} \right)_{it} \quad (2)$$

va , pr , ncm , p , c respectively stand for the industrial added value of the firm, the total salary of the worker, the net intermediate input factor of the enterprise, the product price of the firm and the marginal cost of the firm.

3.3. **Data sources.** The data used in the empirical part of this paper mainly come from China Industry Business Performance Database, China Customs Trade Database and China Statistical Yearbook from 2000 to 2007. Based on the research methods of Tian and Yu [20], the data of China Industry Business Performance at the enterprise level is matched and merged with the data of China Customs Trade at the product level.

4. Analysis and Results.

4.1. **Baseline regression results.** Table 1 presents the regression results. In order to investigate the robustness of the results, Model 1 to Model 7 in Table 1 are the baseline regression results obtained by gradually adding control variables. Model 1 of Table 1 only considers the income gap, income gap squared, markup and the use rate of imported intermediates, the results show that the estimation coefficient of the primary term of income

TABLE 1. Influence of income gap on firms' export DVAR (benchmark model)

Variable	1	2	3	4	5	6	7
gini	0.0669** (0.0286)	0.0652** (0.0286)	0.0631** (0.0286)	0.0651** (0.0286)	0.0656** (0.0286)	0.0666** (0.0286)	0.0609** (0.0285)
gini ²	-0.0196* (0.0127)	-0.0186* (0.0127)	-0.0174* (0.0127)	-0.0182* (0.0127)	-0.0185* (0.0127)	-0.0191* (0.0127)	-0.0164*** (0.0127)
mkp	0.1098*** (0.0022)	0.1091*** (0.0022)	0.1092*** (0.0022)	0.1109*** (0.0022)	0.1105*** (0.0022)	0.1110*** (0.0022)	0.0884*** (0.0023)
IMR	-0.0045*** (0.0000)	-0.0044*** (0.0000)	-0.0044*** (0.0000)	-0.0045*** (0.0000)	-0.0044*** (0.0000)	-0.0044*** (0.0000)	-0.0044*** (0.0000)
Size		-0.0109*** (0.0021)	-0.0098*** (0.0021)	-0.0080*** (0.0021)	-0.0083*** (0.0021)	-0.0075*** (0.0022)	-0.0203*** (0.0024)
Age			0.0212*** (0.0050)	0.0208*** (0.0050)	0.0205*** (0.0050)	0.0217*** (0.0050)	0.0203*** (0.0049)
Vwage				0.0183*** (0.0023)	0.0184*** (0.0023)	0.0216*** (0.0024)	0.0143*** (0.0024)
Lev					-0.0389*** (0.0052)	-0.0406*** (0.0052)	-0.0367*** (0.0052)
Cap						-0.0107*** (0.0017)	-0.0072*** (0.0017)
Tfp							0.2970*** (0.0111)
Constant	-0.2521*** (0.0286)	-0.3715*** (0.0369)	-0.4099*** (0.0380)	-0.4417*** (0.0332)	-0.4237*** (0.0383)	-0.3856*** (0.0388)	-0.6636*** (0.0400)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84752	84752	84691	84691	84685	84552	84281
R-squared	0.7369	0.7370	0.7370	0.7373	0.7375	0.7377	0.7407

Note: Standard errors are in brackets;

The significance levels are as follows: * if $P < 0.1$, ** if $P < 0.05$, *** if $P < 0.001$.

gap is significantly positive, and the estimation coefficient of the square term of income gap is significantly negative. This conclusion preliminarily shows an inverted U-shaped relationship between income gap and firms' export DVAR, which supports hypothesis 3. Models 2 to 7 are the regression results after the gradual addition of control variables. The regression coefficients of the primary term of income gap in each model are all significantly positive, and the regression coefficients of the square term of income gap are all significantly negative. It can be found that the inverted U-shaped relationship between income gap and firms' export DVAR is robust. At the same time, Models 1 to 7 show the coefficient of markup is significantly positive, and the coefficient of the relative price of imported products and domestic products is significantly negative, which verifies the theoretical model on the influence factor of firms' export DVAR decomposition, namely markup, the relative price of imported products and domestic products is higher, the greater the firms' export DVAR.

4.2. Conditional influence of innovation on income gap effect. Table 2 lists the conditional effect test based on output value of new product (Inn) as a proxy variable. The results of interaction term ($\text{gini} \times \text{Inn}$, $\text{gini}^2 \times \text{Inn}$) reflect the impact of income gap on firms' export DVAR through innovation behavior. From column 1 to column 3 in Table 2, it can be found that the interaction term $\text{gini} \times \text{Inn}$ is significantly positive, and the interaction term $\text{gini}^2 \times \text{Inn}$ is significantly negative, indicating that the impact effect

TABLE 2. Conditional influence of innovation activities on income gap effect

Variable	1	2	3
gini	0.1373*** (0.0113)	0.1219*** (0.0359)	0.1249*** (0.0359)
gini ²	-0.0248*** (0.0153)	-0.0264* (0.0159)	-0.0276* (0.0159)
gini × Inn	0.0107* (0.0074)	0.0194* (0.0122)	0.0194* (0.0122)
gini ² × Inn	-0.0048* (0.0035)	-0.0089* (0.0060)	-0.0089* (0.0060)
Inn	0.0150* (0.0079)	0.0207* (0.0113)	0.0207* (0.0113)
Control variables	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Company dummies	No	Yes	Yes
Industry dummies	No	No	Yes
Constant	-1.2439*** (0.0207)	-0.8454*** (0.0504)	-0.8379*** (0.0505)
Observations	84330	69461	69460
R-squared	0.5390	0.6757	0.6756

Note: Standard errors are in brackets;

The significance levels are as follows: * if $P < 0.1$, ** if $P < 0.05$,

*** if $P < 0.001$.

of income gap is affected by the condition of innovation behavior, that is, the income gap is small, it promotes the R&D innovation behavior of firms, and then improves the export DVAR of firms. When the income gap expands and reaches a certain threshold value, the R&D innovation output of firms decreases, thus reducing the export DVAR of firms.

4.3. Mediation effect analysis. Table 3 lists the test results based on mediating variables, in which Model 1 reports the impact of income gap on innovation activities. The results show that the estimated coefficient of the primary term of income gap is significantly positive, while the estimated coefficient of the square term of income gap is significantly negative, indicating an inverted U-shaped relationship between income gap and firms' innovation effect. Model 2 reports the impact of innovation on firms' export DVAR, and the results show that the estimated coefficient is significantly positive, which means that innovation activities can significantly improve the export DVAR of firms in China. Model 3 and Model 4 respectively report the regression results of innovation activities on the cost-plus rate of enterprises and the proportion of imported intermediates, can find innovative activities significantly increase the markup and reduce the proportion of import intermediates, and the conclusion is consistent with the existing literature basic [20]. Model 5 and Model 6 show that after controlling the firms' markup and the proportion of imported intermediate products respectively, the estimated coefficients of the firms' markup and the proportion of imported intermediate products are still significant. Although the estimated coefficient of the R&D innovation variable is significant, they decrease significantly. The above conclusions well demonstrate that the markup and the proportion of imported intermediate products are the mediating effects of R&D innovation activities on firms' export DVAR.

4.4. Robustness check. In this paper, two robustness tests are used to examine the robustness of the empirical results. First, another method is adopted to measure the export

TABLE 3. Test of possible mediating variables of conditional effects of innovation activities

Variable	1	2	3	4	5	6	7
	Inn	DVAR	mkp	IMR	DVAR	DVAR	DVAR
gini	0.2080* (0.1249)						
gini ²	-0.0843* (0.0534)						
Inn		0.0026* (0.0015)	0.0037** (0.0018)	-0.3113* (0.2056)	0.0026* (0.0015)	0.0023* (0.0013)	0.0023* (0.0013)
mkp					0.0068*** (0.0021)		0.0437*** (0.0019)
IMR						-0.0042*** (0.0000)	-0.0044*** (0.0000)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company dummies	Yes	Yes	Yes	No	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.5276*** (0.1423)	-1.3165*** (0.0280)	-1.1450*** (0.0264)	0.6619*** (0.0308)	-1.3087*** (0.0281)	-1.0768*** (0.0253)	-1.0181*** (0.0253)
Observations	64781	73383	73888	73888	73383	73383	73383
R-squared	0.5370	0.6767	0.2758	0.6099	0.6768	0.7326	0.7352

Note: Standard errors are in brackets;

The significance levels are as follows: * if $P < 0.1$, ** if $P < 0.05$, *** if $P < 0.001$.

DVAR index of firms. The benchmark regression in this paper adopts the assumption that the domestic intermediate factor input contains 5% of the share of foreign products when calculating the export DVAR of firms as the explained variable, and the assumption is that the share of foreign products in the domestic raw materials put into use is 10%, re-calculating the export DVAR of firms. Second, in order to overcome the endogenous problems caused by reverse causality and omitted variables, this paper adopts the instrumental variable method and the generalized moment estimation method (GMM) to deal with the problem. The main regression results of the two robustness tests are not fundamentally changed. Limited by space, specific robust results are not reported here.

5. Conclusions. This paper finds an inverted U-shaped relationship between income gap and enterprise export DVAR. Secondly, the regression results of moderating effect of R&D innovation behavior show that income gap can influence export DVAR through influencing firm innovation behavior. Finally, the mechanism test shows that the impact of enterprises' innovation behavior on export DVAR can be decomposed into two major effects, namely "cost-plus effect of firms" and "relative price effect of imported intermediate goods and domestic intermediate inputs", both of which are significant mediating variables of firms' innovation behavior on export DVAR. Specifically, innovation activities significantly improve the cost-plus rate of firms and the proportion of domestic intermediate inputs, that is, firms influence the export DVAR through the improvement of competitiveness and import substitution in the upstream industry. Since China's economic development level is characterized by significant regional development imbalance, the income gap between different regions may have a heterogeneous impact on firms' export DVAR. Therefore, in the future, it is necessary to further distinguish the geographical location of enterprises

and the characteristics of other different aspects of enterprises, and conduct sample studies to specifically explore the impact of income gap on DVAR of enterprises with different regions and characteristics.

The policy implications of this study are as follows. First, accelerate the reform of income distribution system, narrow the income gap, rationally optimize the consumption structure, expand the demand scale, and ultimately improve the export DVAR of firms. On the one hand, the government should actively play the regulating role of fiscal expenditure, optimize the structure of fiscal expenditure, vigorously support low-income groups, and increase the proportion of middle-income groups; on the other hand, the government should actively exert the adjustment effect of tax on income distribution and improve the tax system. In view of regional differences, the government can take measures such as strengthening industrial transfer and inter-regional coordinated development to speed up the reform of income distribution system according to local conditions, such as actively introducing and transferring technology, industry, talents and resources from the eastern region to the central and western regions, and balancing and optimizing the strategic development layout. Second, further promote the innovation-driven development strategy of firms and guide them to move toward the higher end of technology. Experience shows that firms' R&D innovation behavior has a positive moderating effect on the impact of income gap on export DVAR. Therefore, firms should be actively guided to increase R&D and innovation motivation and investment, and gradually promote the improvement of product technology content and added value.

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