

China's 40 Years Demographic Dividend and Labour Supply: The Quantity Myth

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Presentation at the Asian Economic Development Conference

July 8, 2022

Motivation

- ▶ China has experienced fast economic growth for the past thirty or so years.
- ▶ Many believe that this is, in part, due to its favourable population structure: the Demographic Dividend
 - An increasing workforce to support declining dependents.
- ▶ This ‘Dividend’ started to decline and many believes this will create a catastrophic future for China
- ▶ The government took many steps to begin to reverse this trend with little effect: 2015, 2021 ⇒ Panic!

“Low fertility not only will increase ageing population share of the total population so that to make the society lose its vitality, it also reduce population size and as a consequence, technology improvement would slow down, economy would shrink, the society would involute, and the strength of the nation would reduce...

... the drop in fertility is to loose our future and a long term decline of fertility would see a collapse of the economy and the disappearing of the race... ”

— A famous Chinese public intellectual

Question

- ▶ Was the 'Demographic Dividend' (DD) a major driving force for China's long lasting economic growth?
- ▶ DD: the working age population (WA) as a share of the total population
- ▶ DD \Rightarrow economic growth: through the quantity of labour supply (higher share of pop in workforce)

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What I do

- ▶ Examine labour supply over the past 35 years
 - ▶ Quantity of labour supply: WA and Labour force participation
 - ▶ Structure of labour supply: sector of employment and migration
 - ▶ Quality of labour supply: education level of workforce
- ▶ Examine the relationship between per capita gdp growth and DD controlling for quality of labour supply and other relevant variables.

Data

Labour Supply

- ▶ 1% sample of the Population censuses 1982, 1990, 2000, 2010
- ▶ some portions of the 1% intercensal population survey 2005 and 2015.

Data

Labour Supply

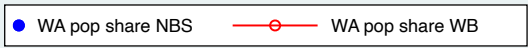
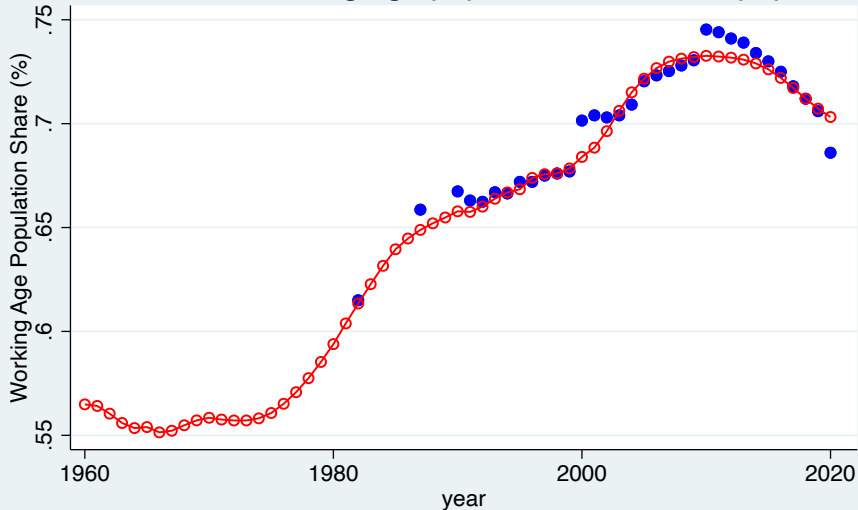
- ▶ 1% sample of the Population censuses 1982, 1990, 2000, 2010
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Growth Regression

- (1) Generated prefecture level labour supply (quality, quantity, structure change) and population variables from the Censuses and intercensal pop surveys.
- (2) Collected prefecture level growth, capital stock and other relevant variables from statistical yearbooks.

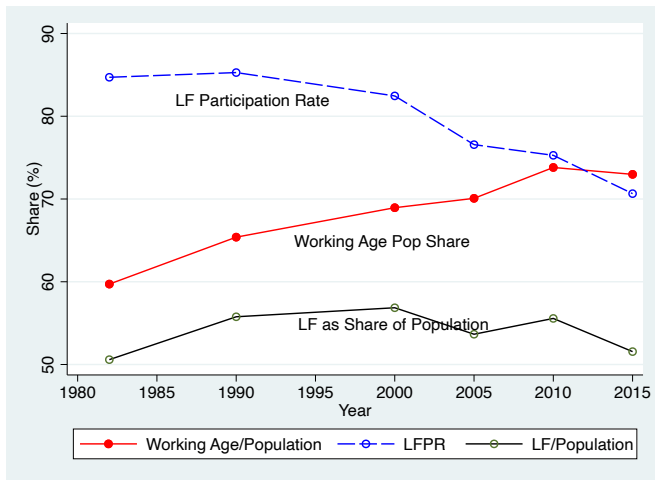
1. Demographic Dividend and Labour Supply

China's working age pop share of the total pop



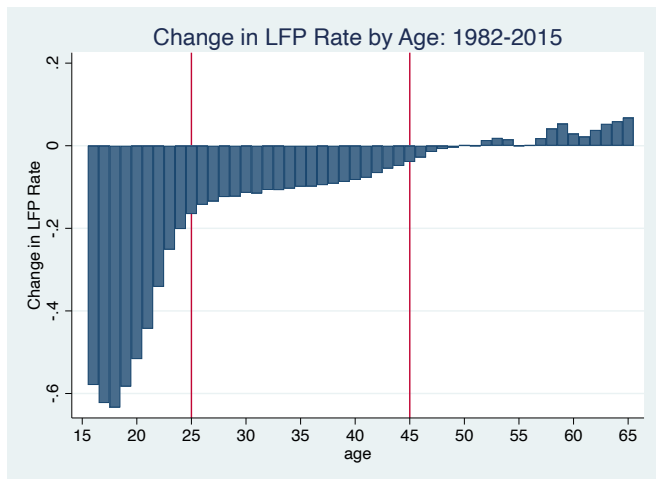
Quantity of labour supply

- ▶ Quantity of labour supply does not only depend on the age structure of the total population
- ▶ The quantity of labour supply is also a behavioural issue: labour force participation.



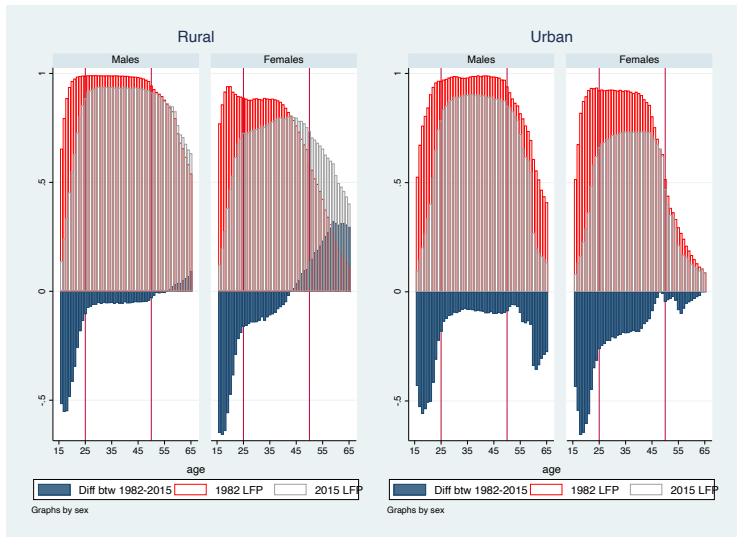
Quantity of labour supply

- ▶ Who's participation rate has dropped the most? – by age

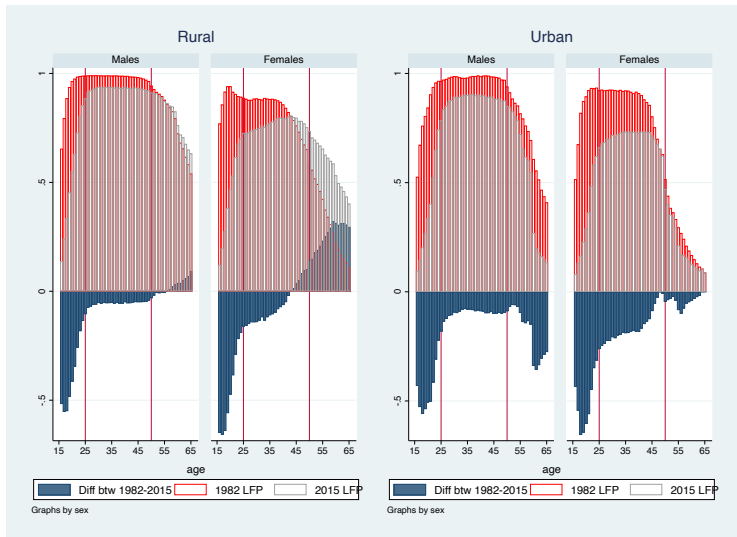


- ▶ The young reduced participation sharply (over 50pcp)
- ▶ The primary aged LFPR also dropped, but mostly urban (22pcp)
- ▶ The over 50: participation rate slightly increased.

▶ Who's participation rate has dropped the most? – by age, gender and hukou



- Who's participation rate has dropped the most? – by age, gender and hukou



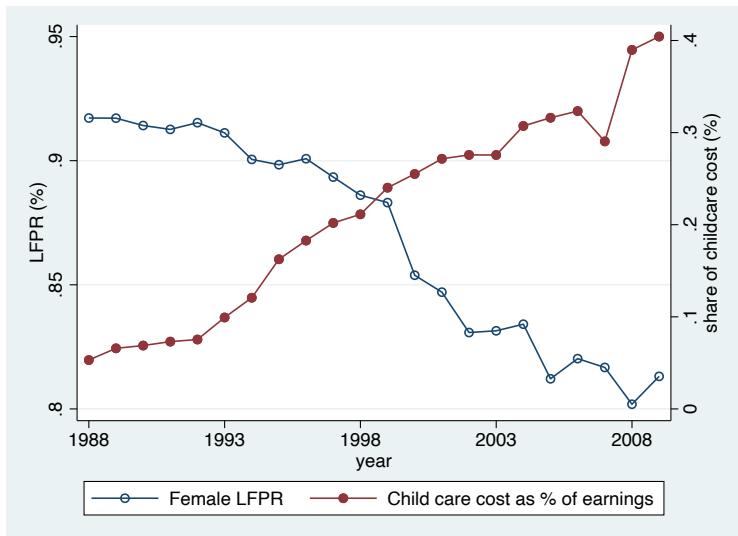
- The young everywhere reduced participation sharply — education
- The primary age group: Women, but more so for urban women (25%)
- Rural over 50 women increased participation rate while urban both gender LFPR declined.

Quantity of labour supply

- ▶ Youth: 1986 compulsory schooling law (school leaving age 16), 1999 tertiary education expansion
- ▶ Primary age group: reduction mainly for women, and especially urban women
 - ▶ Mao era women's LFPR was rather high: 1982 77%
 - ▶ Economic reform: 1. individuals choice/income increase; 2. childcare privatisation, substantially increased childcare cost. ▶ pg9
- ▶ Over 50 group: Contrast between rural and urban ⇒ Compulsory retirement for urban workers 50 for women and 60 for men, while rural workers have limited access to pension. ◀ pg10

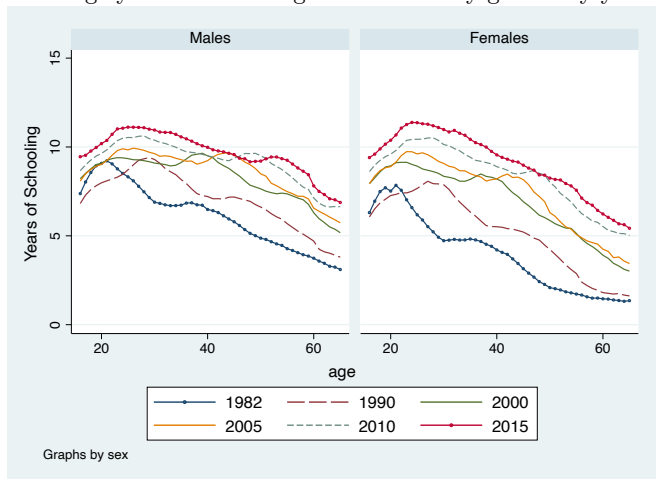
- (1) Quantity of labour supply did not increase too much due to the reduction in participation rate
- (2) Policy induced behavioural changes have been an important part of the reduction in the share of labour supply.

Urban FLFPR and Childcare Cost



Quality of labour supply

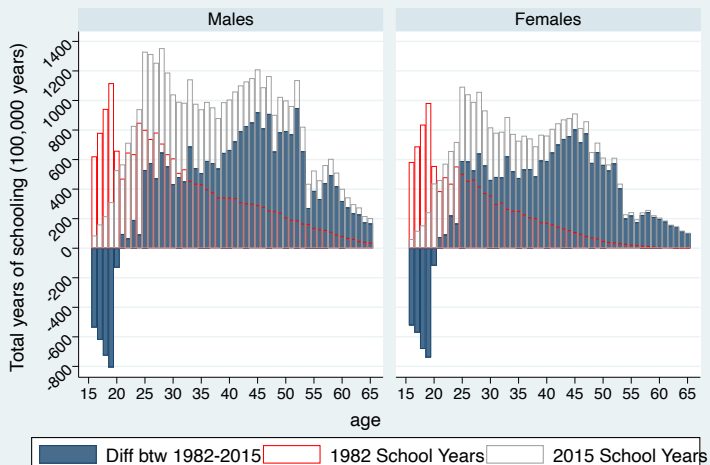
Average years of schooling of workforce by gender by year



- ▶ Almost for every age group of the workforce, average years of schooling has increased by 2-5 years;
- ▶ Female schooling in particular, increased everywhere by almost 5 years!

Quality of labour supply

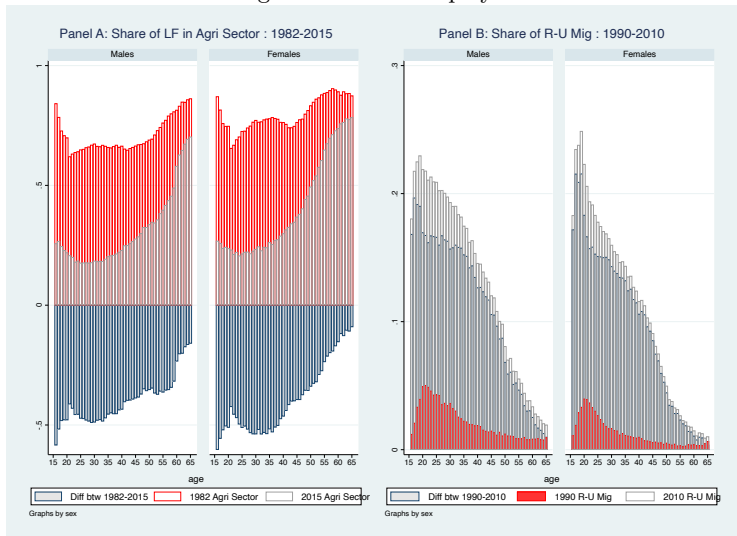
Quantity adjusted labour supply



Graphs by sex

Structural change of labour supply

Change in sector of employment



Labour supply

- ▶ Quantity:
 - ▶ Working age population share has been increasing over the period of 1980 to 2010;
 - ▶ The increase was almost offset by the decline in labour force participation rate;
 - ▶ The share of workforce in total population almost stayed constant
- ▶ Quality: Substantial increase in education, and hence, quality adjusted labour supply (human capital stock) increased
- ▶ Structural change of labour supply:
 - ▶ Almost 50% drop in labour force working in Ag industry, especially the young;
 - ▶ Large increase in rural to urban migration

2. Economic Growth and Demographic Dividend

Growth and DD

- ▶ Literature links demographic dividend with economic growth through an identity

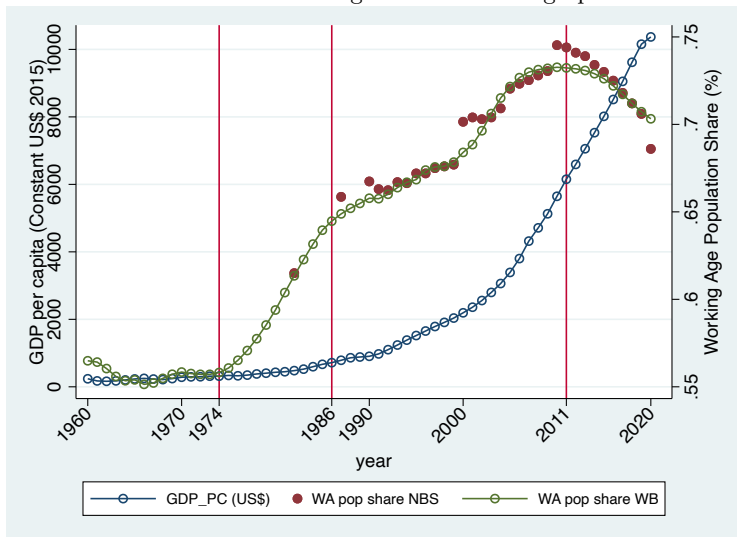
$$\frac{Y}{N} = \frac{Y}{L} * \frac{L}{WA} * \frac{WA}{N}, \text{ and, } \ln \frac{Y}{N} = \ln \frac{Y}{L} + \ln \frac{L}{WA} + \ln \frac{WA}{N} \quad (1)$$

where $\frac{Y}{N}$ is per capita GDP; $\frac{Y}{L}$ is GDP per worker; $\frac{L}{WA}$ is the LFPR; and $\frac{WA}{N}$ is working age population share of total population.

- ▶ As it is an identity, in regression, one item is dropped. Normally assume participation rate is constant
- ▶ So, a production function plus the DD term

Growth and DD

Correlation between economic growth and Demographic Dividend



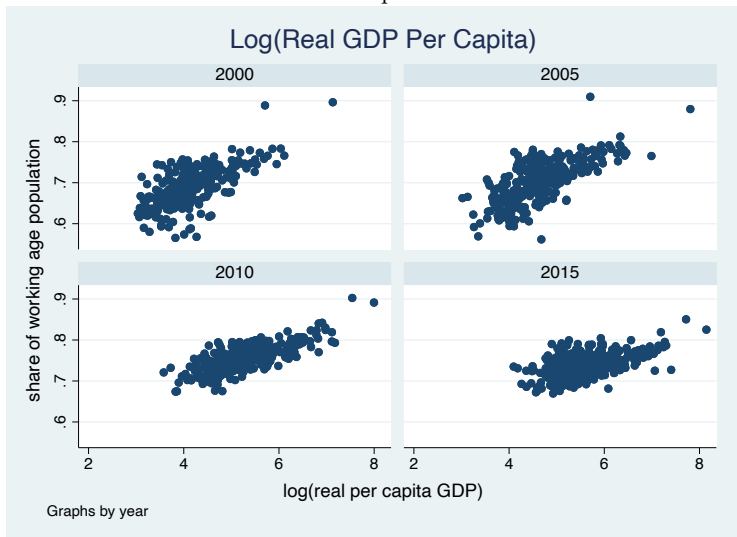
Growth and DD

- ▶ I use prefecture data for the census and intercensal years
- ▶ Assuming lagged dependent variables and other lagged variables all affecting total factor productivity, and take the difference:

$$\begin{aligned}\Delta \ln \tilde{y}_{jt} = & \beta_1 \Delta k_{jt} + \beta_2 \Delta \ln \text{ysch}_{jt} + \beta_3 \Delta \ln \text{migr}_{jt} + \beta_4 \Delta \ln \text{wa}_{jt} \\ & + \gamma_1 \ln \tilde{y}_{j,t-1} + \gamma_2 \ln \text{wa}_{j,t-1} + \gamma_3 \ln \text{migr}_{j,t-1} + \gamma_4 \ln h_{j,t-1} + \varepsilon_{jt},\end{aligned}\tag{2}$$

Growth and DD

Unconditional Relationship between GDP and DD

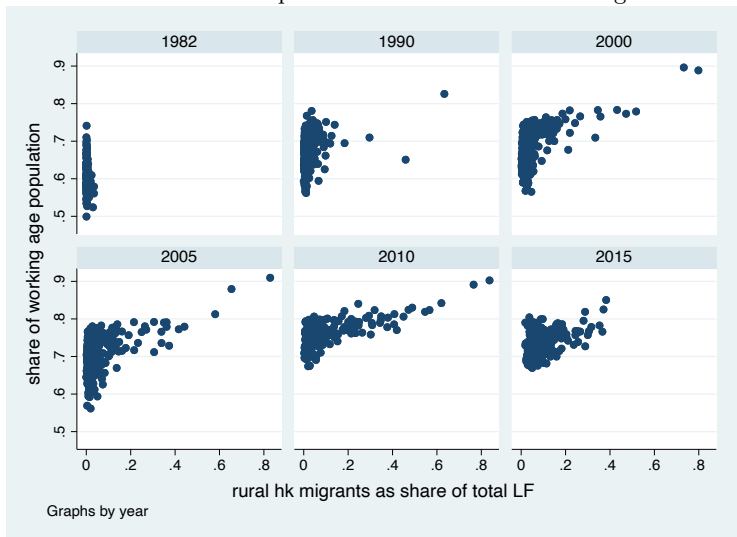


Results

	Δ Log real GDP per capita			
	(1)	(2)	(3)	(4)
$\ln wa_{j,t-1}$	0.906** (0.425)	0.782*** (0.237)	0.609** (0.238)	0.232 (0.240)
$\Delta \ln wa$	1.783*** (0.341)	0.465** (0.193)	0.353* (0.193)	-0.096 (0.196)
$\Delta \ln k$		0.024*** (0.007)	0.024*** (0.007)	0.028*** (0.007)
$\ln \tilde{y}_{j,t-1}$		-0.854*** (0.021)	-0.843*** (0.021)	-0.838*** (0.021)
$\ln migr_{j,t-1}$			0.033** (0.016)	0.002 (0.016)
$\Delta \ln migr$			0.047*** (0.011)	0.033*** (0.011)
$\ln nysch_{j,t-1}$				1.487*** (0.221)
$\Delta \ln nysch$				1.530*** (0.207)
Observations	1059	1055	1055	1055
Within R^2	0.24	0.76	0.77	0.79

Growth and DD

Unconditional Relationship between DD and Share of Migrants in LF



Conclusion

- ▶ DD has been regarded as one of the driving force for China's economic growth
- ▶ As it is fading away, and China's reversal of the OCP did not instantly reverse the declining trend of the fertility, people are worried.
- ▶ The findings in this paper indicate that from economic growth point of view
 - ▶ Conditional on working age population size, there are huge room to manoeuvre regarding quantity of labour supply:
 - ▶ Participation rate;
 - ▶ compulsory retirement age;
 - ▶ childcare cost;
 - ▶ ...
 - ▶ What lost in the quantity can be gained by quality and structure change of labour supply
- ▶ Looking forward, as AI and new technology work its way to dominate production process, quality will be the key to economic success, not quantity.
- ▶ No need to panic!