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AGE STRUCTURE AND INFLATION DYNAMICS IN PACIFIC ISLAND ECONOMIES

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ABSTRACT

This study uses the panel of six Pacific Island Countries (PICs) to investigate the relationship between changing age structures and inflation. The findings suggest that both aggregated and disaggregated shares of the working-age population exert disinflationary pressure. This supports the life cycle hypothesis, which postulates that people in their productive years tend to save and produce more than they consume, fostering economic stability and managing inflation. Conversely, the findings indicate that old-age dependency contributes to inflationary pressures. These insights underscore the importance of demographic dynamics in shaping inflation trends and provide valuable guidance for policymakers aiming to maintain price stability.

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I. INTRODUCTION

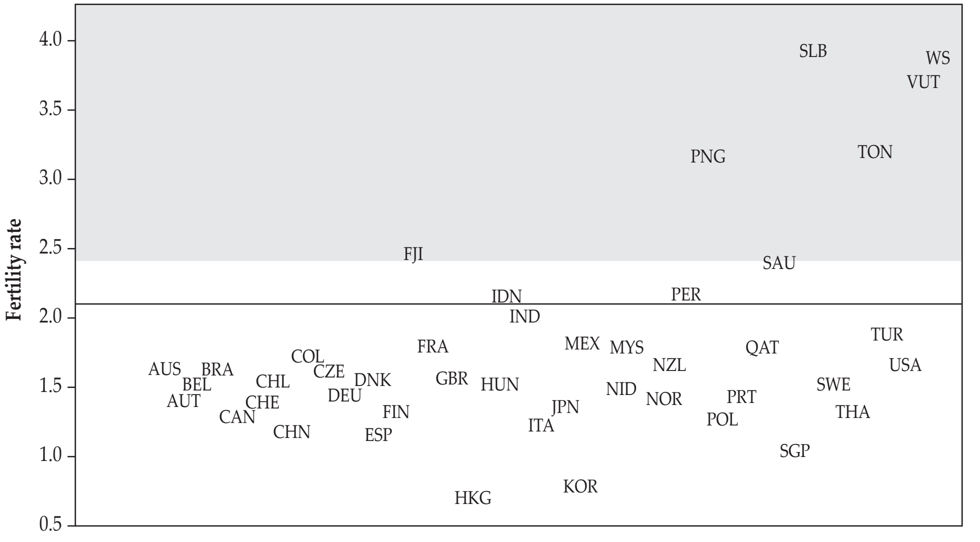
This study examines how changing age structures impact inflation in the case of Pacific Island Countries (PICs). Inflation dynamics in PICs differ distinctly from those observed in advanced and emerging market economies, primarily due to their unique economic structures and high external vulnerability. As small open economies, PICs heavily rely on imports for both consumption and production, rendering their domestic price levels highly susceptible to external shocks, particularly fluctuations in global commodities (Dewan *et al*., 1999; Makun, 2021). This import dependence diminishes the efficacy of conventional monetary policy tools in controlling inflation, as domestic interest rate adjustments have limited influence on externally driven price movements. However, the inflationary landscape in PICs has undergone notable changes, especially after the global financial crisis. Bai (2016) argue that several PICs have enhanced their macroeconomic resilience by adopting targeted policy instruments, including price controls on essential commodities, subsidies, and more disciplined fiscal and monetary management. Despite the predominant role of external factors, domestic structural variables have increasingly shaped inflation outcomes in PICs. One such factor is the labor market, where wage setting is critical in inflation persistence (Dewan and Hussain, 2001). The ongoing demographic transition is critical, as shifts in cohort size and age distribution strongly influence the labour force, which can exert substantial pressure on prices via wage dynamics.

Though lagged, PICs, like all other economies, are experiencing declining fertility and rising life expectancy rates (Bloom and Luca, 2016). Fertility rates in many PICs have dropped considerably over the past few decades. In Fiji, fertility rate dropped from 3.9 children per woman in 1980 to approximately 2.6 in 2022. Likewise, Tonga's fertility rate fell from 5.5 to 3.4, Vanuatu from 5.6 to around 3.6, the Solomon Islands from 6.7 to 4, Samoa from 6.2 to 3.7, and Papua New Guinea from 5.7 to 3.4. However, as depicted in Figure 1 (Panel A), the fertility rate in PICs was comparatively higher than that of advanced economies and emerging market economies in 2022, with the green line in Panel A denoting the replacement-level fertility threshold.

Figure 1.
Fertility Rate and Life Expectancy Rates

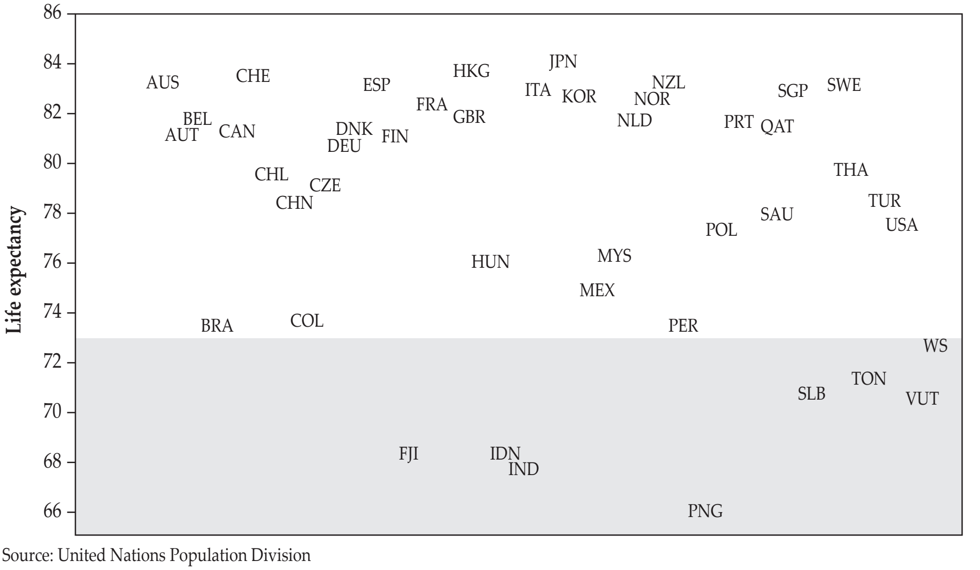
This figure presents the figures of fertility and life expectancy rates for PICs, advanced economies and emerging market economies in 2022. The green line in Panel A represents replacement rate. The acronyms in red indicate advanced and emerging market economies, and acronyms in blue indicate PICs.

Panel A: Fertility Rate



Source: United Nations Population Division

Panel B: Life Expectancy Rate



Source: United Nations Population Division

Concerning life expectancy, PICs similar to rest of the world is experiencing an increasing trend. In Fiji, life expectancy has increased from 64 to around 68 years, while Vanuatu saw an improvement from 60 to around 71 years. Similarly, Tonga rose from 66 to around 71 years, the Solomon Islands from 62 to around 73 years, Samoa from 63 to around 74 years, and Papua New Guinea from 52 to around 65 years. Despite this rise, as shown in Figure 1 (Panel B), life expectancy in these economies remains relatively low compared to most advanced and emerging market economies, with the exception of India and Indonesia in 2022. These demographic indicators suggest that demographic transition in PICs is comparatively in its earlier stage. However, the changes in demographic indicators alter the cohort sizes and age structures, influencing the labor force, consumption, saving, and labor productivity, eventually impacting the economy's price level (Lee, 2016).

The inflation and demography nexus gained attention as Japan's aging population associated itself with disinflationary pressure, contradicting the life cycle theory. Further, the Governor of the Bank of Japan, Masaaki Shirakawa, in opening remarks at the 2012 BOJ-IMES Conference, stated the importance of inflation and demography nexus: "*Seemingly, there would be no linkage between demography and deflation. But it may not be the case.*" Figure 2 illustrates the relationship between inflation and the dependency rate, in line with the analysis of Jesulius and Takats (2015). Although they differ in magnitude, both variables display broadly similar trends.

Figure 2.
Inflation and Dependency Rate

This figure presents the inflation and dependency rate plots for six PICs.

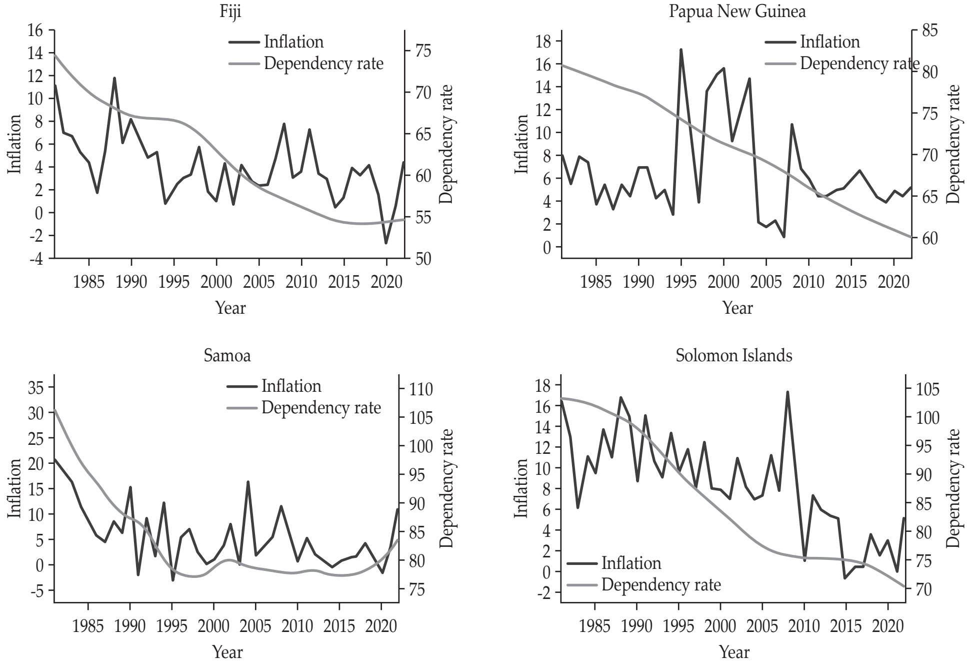
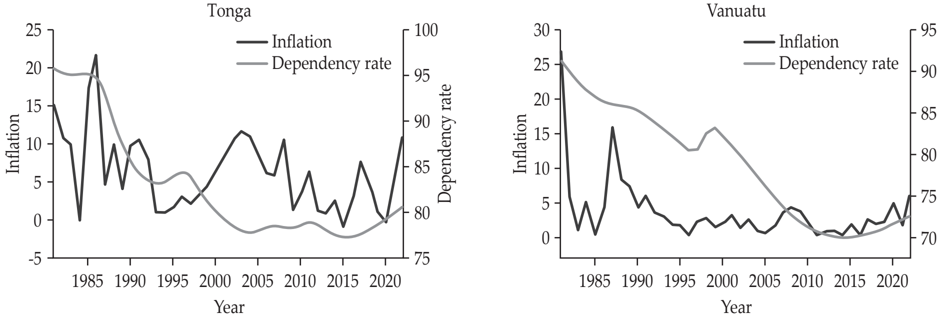


Figure 2.
Inflation and Dependency Rate (Continued)



Source: BIS & United Nations Population Division

There are several channels through which demographic changes can be linked to changes in price level. First, Modigliani and Brumberg's (1954) life-cycle hypothesis posits that forward-looking individuals aim to smooth consumption over their lifetime by saving during their working years and drawing down those savings after retirement. Aggregated across the population, this age-dependent behavior means that cohort size and age structure shifts systematically alter the balance between aggregate demand and supply, influencing the price levels. Second, Summers (2015) reexamines the secular stagnation hypothesis as a framework for interpreting the persistent weakness of inflation in aging economies. He argues that demographic transitions, particularly large cohorts' retirement, have dampened aggregate demand, thereby exerting disinflationary pressure. In addition, as life expectancy increases, retirees tend to prolong their asset holdings, leading to lower-than-expected dissaving rates. The reduced propensity to consume among the elderly has resulted in weaker consumption demand with subsequent influence on prices. Finally, Bullard *et al*. (2012) have linked changing age structure and inflation through the lens of political economy. In democratic economies experiencing the retirement of the largest cohort, the political power prefers low inflation as the high price level can erode the saving of the aging population. The biasedness of the political power to uphold their position based on age structure can also influence price levels.

Yet, these theoretical relationships result in divergent views on the old-age dependency's impact on inflation. In line with the life cycle hypothesis, old-age dependency is expected to be inflationary as retirees spend their accumulated savings, increasing aggregate demand. In contrast, the secular stagnation hypothesis and the political economy perspective suggest that old-age dependency is disinflationary. The former emphasizes reduced dissaving due to rising life expectancy, while the latter highlights the political preference for low inflation to protect the savings of an aging population.

Due to theoretical ambiguity, we delve into empirical literature to gain deeper insights into the changing age structure and inflation nexus. Empirical evidence from Andrews *et al*. (2019), Gajewski (2015), Lee *et al*. (2024), and Wang and Chu (2021) lend support to the view that population aging tends to exert a disinflationary effect. In contrast, the research of Aksoy *et al*. (2019), Goodhart and Pradhan (2020), Jesulius and Takats (2021), and Lindh (2004) points to the opposite conclusion, suggesting that a higher share of elderly dependents contributes to inflationary pressures. Addressing the contradictory findings in the empirical literature, Rai and Garg (2024), using panels of advanced and emerging market economies, suggest that the timing of demographic transitions and the subsequent age structure are crucial for understanding their impact on inflation. They found differing results between advanced and emerging market economies, largely due to the relative positioning of the largest population cohorts within the age structure.

Drawing on existing empirical research, this study investigates how demographic shifts in age composition influence inflation in PICs The primary contribution of this research lies in being the first to investigate this relationship in the context of PICs. Unlike advanced and emerging market economies, PICs are in early stages of demographic transition. The findings of this study will offer valuable insights into how their demographic structure influences key macroeconomic indicators, contributing to a deeper understanding of these unique economies. Therefore, we examine how shifting age structure will impact inflation using the following research questions.

RQ1. Does the changing share of the working-age population play a significant role in driving inflation?

RQ2. Do different groups within the working-age population affect inflation differently?

RQ3. How are the changes in the old-age dependency rate associated with inflation in the case of PICs?

Notably, our findings reveal that the working-age population share exerts a significant negative effect on inflation in PICs. This finding aligns with the study of Aksoy *et al*. (2019) and Jesulius and Takats (2021). Moreover, there is no evidence of aggregation bias, as both the young and prime working-age populations are found to exert significant disinflationary effects. In contrast, old-age dependency shows a significant positive contribution to inflation. This finding aligns with the study of Aksoy *et al*. (2019), Goodhart and Pradhan (2020), and Jesulius and Takats (2021). This result is attributed to a lagged demographic transition compared to advanced economies.

The rest of the paper is structured as follows: Section 2 describes the data, sample, and methodology used in the study. Section 3 reports both the preliminary and main findings. Section 4 concludes the paper.

II. DATA AND METHODOLOGY

A. Data

Based on data availability, we have considered the panel of six PICs following Lal *et al*. (2002) and used the annual data from 1981 to 2022. The countries considered are Fiji, Papua New Guinea, Solomon Islands, Samoa, Tonga, and Vanuatu. The variables used in this study are as follows. The dependent variable, *inflation*, is measured as the annual change of the Consumer Price Index (CPI). The demographic indicators include the following: *work*, defined as the proportion of individuals aged 20–59 relative to the total population; *ywork*, representing the share of the younger working-age group (20–39 years) in the total population; and *pwork*, denoting the share of the prime working-age group (40–59 years) within the overall population.

old change in the old-age dependency rate, which is a ratio of the old population (60+) to the working-age population (age 20 to 59). In addition, we have also introduced control variables in the model: *output* is the GDP growth rate used to capture the domestic demand-side pressures. *ms* is money supply growth, a proxy for liquidity-driven inflation pressures. *open* in trade openness, which captures the degree of external exposure and potential pass-through of commodity prices; *reer* is the real effective exchange rate, which captures external competitiveness and pass-through effects; and *oil* is the real oil price, which acts as a proxy for global supply shocks and is particularly relevant in the context of energy-dependent economies. All variables are transformed to natural logarithmic form. In addition, the growth rates of demographic indicators are employed to mitigate the influence of strong trend components, following Goh and McNown (2020). The economic variables are collected from World Development Indicators, the demographic indicators from United Nations population division and oil prices from Energy Information Administration.

B. Methodology

This study applies the Dynamic Common Correlated Effects (DCCE) estimator introduced by Chudik and Pesaran (2015), which extends the common correlated effects methodology originally proposed by Pesaran (2006). The DCCE framework is specifically designed to address cross-sectional dependence, a situation in which disturbances across panel units exhibit correlation due to the influence of shared global shocks or common factors. If left unaccounted for, such dependence can result in biased and inconsistent parameter estimates.

To mitigate this issue, the DCCE approach incorporates the cross-sectional averages of both dependent and explanatory variables, thereby serving as a proxy for unobserved common influences.

$$y_{it} = \alpha_i + \rho_i y_{it-1} + \beta_i x_{it} + \sum_{k=0}^{PT} \theta_{ik} \bar{Z}_{t-k} + e_{it} \tag{1}$$

where, $\bar{Z}_t = \overline{y_{t-1}}, \bar{x_t}$ is cross-sectional averages of dependent and independent variables. y_{it} is the dependent variable, x_{it} is the independent variable, e_{it} is an error term, ρ_i is the coefficient of the lagged dependent variable and β_i is the coefficient of the independent variable.

III. RESULTS

A. Preliminary Results

Table 1 reports the descriptive statistics along with the results of the cross-sectional dependence tests. The mean values show that the old-age dependency, working-age population and its disaggregates, young working-age and prime working-age, are all exhibiting upward growth trends. To assess cross-sectional dependence, we applied the Pesaran (2021) test. The results indicate rejection of the null hypothesis of weak cross-sectional dependence for every variable except money supply. This indicates that the data exhibits strong cross-sectional dependence, most likely caused by unobserved common factors.

Table 1.
Descriptive Statistics

This table presents the descriptive statistics and cross-sectional dependence test results. *inflation* is CPI growth rate, *work* is changing in the share of the working-age population, *ywork* is changing in the share of the young working-age population, *pwork* is changing in the share of the prime working-age population, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, and *oil* is the real oil price. Mean is the average value, Std. dev. is standard deviation, Min. is the minimum value, Max. is the maximum value, CD. is cross-sectional dependence test statistics, and Obs. is total observation. *, **, and *** indicate p<0.01, p<0.05, and p<0.1, respectively.

	Mean	Std. dev.	Min.	Max.	CD.	Obs.
inflation	2.107	1.007	-1.787	3.983	5.636*	252
work	0.199	0.332	-0.863	1.401	3.813*	252
ywork	0.061	0.575	-1.708	1.937	5.883*	252
pwork	0.719	0.991	-2.128	2.926	3.442*	252
old	0.742	1.528	-4.744	4.347	4.079*	252
output	0.989	1.674	-3.529	3.679	2.607*	251
ms	2.330	1.676	-3.561	4.901	0.662	240
open	5.228	0.244	4.502	5.958	14.525*	213
reer	5.368	0.182	5.006	5.882	7.664*	168
oil	4.707	0.579	3.410	6.952	20.664*	252

Next, rely on the Cross-sectional Augmented Dickey-Fuller (CADF) procedure developed by Pesaran (2007), a second-generation test for detecting unit roots in the presence of cross-sectional dependence. Where countries are exposed to common global shocks, the CADF test handles cross-sectional dependence by augmenting the regression with the cross-sectional average and its lagged differences. The following equation represents the specification of the CADF test:

$$\Delta y_{it} = \alpha_i + \rho_i y_{it-1} + \gamma_i \bar{y}_{t-1} + \sum_{j=0}^{p} \lambda_{ij}\, \Delta\bar{y}_{t-j} + e_{it} \tag{2}$$

where y_{it} is a variable under consideration for unit root testing, α_i is the individual-specific intercept, ρ_i is the coefficient on the lagged dependent variable, $\bar{y}_{t-1}$ is the cross-sectional average of the series across all panel units at time t-1, $\Delta\bar{y}_{t-j}$ are lagged changes in the cross-sectional average, and e_{it} is an error term.

Table 2.
Unit Root Test

This table presents cross-sectional augmented Dickey-Fuller unit root test results. *inflation* is CPI growth rate, work is changing in the share of the working-age population, *ywork* is changing in the share of the young working-age population, *pwork* is changing in the share of the prime working-age population, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, open in trade openness, *reer* is the real effective exchange rate, and oil is the real oil price. I(0) and I(1) indicate stationary at levels and first difference, respectively. *, **, and *** indicate p<0.01, p<0.05, and p<0.1, respectively.

	I(0)	I(1)
inflation	-9.262*	
work	0.271	-3.552*
ywork	-0.119	-3.865*
pwork	-1.463***	
old	0.330	-4.433*
output	-8.267*	
ms	-9.960*	
open	-1.873**	
reer	0.903	-7.511*
oil	-0.886	-7.517*

The results concerning the CADF unit root test are presented in Table 2. The unit root results suggest that inflation, the share of the prime working age, GDP growth, money supply growth, and trade openness are stationary at levels. On the other hand, the shares of the working-age and young working-age populations, the ratio of old-age dependency, the real effective exchange rate, and real oil prices are stationary at first differences. Overall, the interest variables for our study are a combination of I(0) and I(1) variables.

B. Main Results

Having established both the presence of cross-sectional dependence and different order of integration, we proceed with the DCCE estimation which addresses cross-sectional dependence caused by omitted variable bias by incorporating lagged cross-sectional averages of the dependent and independent variables, as outlined by Ditzen (2021). The results concerning the impact of changing age structure and inflation in the case of PICs are presented in Table 3.

RQ1. Does the changing share of the working-age population play a significant role in driving inflation?

Declining birth rates alongside improvements in life expectancy are central to today's demographic transition, which has produced exceptionally large population cohorts. This phenomenon occurred earlier in advanced economies, with the so-called "boom generation" born between 1945 and 1965 (Bloom *et al.*, 2010). In contrast, economies undergoing a delayed demographic transition are now witnessing similar patterns. The timing and positioning of this largest cohort are crucial as they influence the labor supply and saving, subsequently influencing the price from both the demand and supply sides. In addition, this cohort's positioning also influences the population's share in different age structures. Hence, we investigate whether the share of the working-age population significantly influences inflation in PICs by using the following specifications.

$$inf_{it} = \alpha_i + \theta_1 inf_{it-1} + \beta_2 work_{it} + \beta_3 output_{it} + \beta_4 ms_{it} + \beta_5 open_{it} + \beta_6 reer_{it} + \beta_7 oil_{it} + e_{it} \quad \text{Model 1}$$

In Model 1, *inflation* is the CPI growth rate, *work* is changing in the share of the working-age population, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, and *oil* is the real oil price. θ_1 is the coefficient of the lagged dependent variable and β_s are the coefficients of independent and control variables.

The results concerning Model 1 are reported in Table 3, where a and b represent the model without and with control variables. The findings indicate that an increase in the proportion of the working-age population exerts a significant downward effect on inflation. The rise in the share of the working-age population increases the labor supply pool, which will lower the cost of production. This effect arises mainly due to downward pressure on wages. PICs with a high prevalence of informal sector employment associated with flexible wage rates are responsive to labor supply dynamics. An abundant labor pool can reduce unit labor costs, particularly in agriculture, allied services, and small-scale manufacturing, which are prevalent in many PICs. The decline in the cost of production through the cost-push channel will exert disinflationary pressure. In addition, generally, working-age individuals will produce more than they consume and will also save according to the life cycle proposition. This will influence demand-side inflationary pressures by reducing consumption demand. Altogether, the rise in the share of the working-age population will contain inflation. Our findings align with the study of Aksoy *et al*. (2019), Goodhart and Pradhan (2020), and Jesulius and Takats (2021).

Concerning control variables, trade openness shows a positive influence, suggesting exposure to international price fluctuations as a factor shaping domestic inflation trends. Similarly, the strong positive relationship between money supply growth and inflation underscores the importance of prudent monetary policies. Finally, the findings indicate that rising global oil prices exert upward pressure on domestic prices. This finding is particularly relevant for PICs, which are often heavily dependent on energy imports. These findings emphasize that effectively integrating the working-age population into productive economic activities can stabilize inflation and lay the groundwork for sustainable economic development.

Table 3.
Main Results

This table presents the results concerning impact of demographic indicators on inflation. *inflation* is CPI growth rate, *work* is changing in the share of the working-age population, *ywork* is changing in the share of the young working-age population, *pwork* is changing in the share of the prime working-age population, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, and *oil* is the real oil price. Models 1, 2, and 3 investigate the impact of the share of the working-age population, the disaggregated working-age population, and old-age dependency rate on inflation respectively. a and b represent model without and with control variables, respectively. *R-square* is mean group R square and *CD* is cross-sectional dependence. The values in the parenthesis are standard errors. *, **, and *** indicate p<0.01, p<0.05, and p<0.1, respectively.

	Model 1a	**Model 1b**	**Model 2a**	**Model 2b**	**Model 3a**	**Model 3b**
c	-0.162	-16.964***	0.067	-12.874	-0.209	13.375
	(0.452)	(10.025)	(0.588)	(20.353)	(0.464)	(29.245)
inflation(t-1)	0.152	0.193*	0.030	0.058	0.132	-0.742
	(0.123)	(0.003)	(0.080)	(0.178)	(0.105)	(0.491)
work	-1.589***	-3.733***				
	(0.897)	(2.264)				
ywork			-0.950	-3.123***		
			(0.602)	(1.702)		
pwork			-0.210**	-0.809*		
			(0.096)	(0.744)		
old					0.202*	0.782**
					(0.054)	(0.394)
output		-0.197*		-0.234*		-0.051
		(0.027)		(0.004)		(0.064)
ms		0.190***		0.080		0.315*
		(0.100)		(0.057)		(0.122)
open		2.270		3.113***		0.891
		(1.551)		(1.792)		(0.785)
reer		0.572		0.605		14.644
		(2.400)		(2.723)		(13.079)
oil		0.376*		0.461**		0.686
		(0.068)		(0.215)		(0.730)
R-square	0.50	0.53	0.49	0.64	0.47	0.44
CD	-3.57*	-0.73	-3.82*	-0.05	-3.80*	0.70

RQ2. Do different groups within the working-age population affect inflation differently?

Rai and Garg (2024) identified aggregation bias relating to the working-age population in both advanced and emerging market economies. Hence, we disaggregate the working-age population into two categories: young and prime working-age populations. This allows us to investigate whether these distinct segments of the working-age population have different effects on inflation. The following specification is used.

$$inf_{it} = \alpha_i + \theta_1 inf_{it-1} + \beta_2 ywork_{it} + \beta_3 pwork_{it} + \beta_4 output_{it} + \beta_5 ms_{it} + \beta_6 open_{it} + \beta_7 reer_{it} + \beta_8 oil_{it} + e_{it} \quad \text{Model 2}$$

In Model 2, inflation is represented by the growth rate of the Consumer Price Index (CPI). The variable *ywork* captures the change in the proportion of the young working-age population, while *pwork* reflects the change in the share of the prime working-age group. Economic activity is measured through the GDP growth rate (*output*), and *ms* denotes money supply growth. Trade openness is represented by *open*, the real effective exchange rate is captured by *reer*, and *oil* corresponds to the real price of oil. θ_1 is the coefficient of the lagged dependent variable and β_s are the coefficients of independent and control variables.

The results concerning Model 2 are presented in Table 3, where a and b represent the model without and with control variables. Our findings show that both young and prime working-age groups generate disinflationary effects, with the impact of the younger cohort being stronger in PICs. This stronger effect stems from the delayed demographic transition, as the largest cohort has only recently started joining the workforce. The influx of young labour subsequently reduces production costs. Compared to their prime counterparts, young working-age individuals charge lower wage rates. If an informal sector can access a younger labor force at lower wage rates, their overall labor costs are reduced. This allows firms to maintain or even lower their prices, further contributing to deflationary pressures within the economy. Concerning prime working age, they are more efficient and productive, which can enhance production. In addition, these individuals are forward-looking and accumulate savings to maintain stable consumption after retirement. Consequently, during their working life, their production exceeds their consumption, leading to additional supply relative to demand and thereby generating disinflationary effects. Policymakers can monitor these trends and consider their impact on inflation, wage growth, and broader economic stability.

RQ3. How are the changes in the old-age dependency rate associated with inflation in the case of PICs?

Several existing studies have examined the impact of the aging population on inflation, which is motivated by the case of Japan. However, the findings of existing empirical literature are mixed. Hence, we examine the impact of old-age dependency on inflation in PICs, which are in the early stages of demographic transition. The following specifications will be used to investigate RQ3:

$$inf_{it} = \alpha_i + \theta_1 inf_{it-1} + \beta_2 old_{it} + \beta_3 output_{it} + \beta_4 ms_{it} + \beta_5 open_{it} + \beta_6 reer_{it} + \beta_7 oil_{it} + e_{it} \quad \text{Model 3}$$

In Model 3, *inflation* is the CPI growth rate, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, and *oil* is the real oil price. θ_1 is the coefficient of the lagged dependent variable and β_s are the coefficients of independent and control variables.

The results concerning Model 3 are presented in Table 3, where a and b represent the model without and with control variables. The findings indicate that aging significantly exerts inflationary pressure on PICs. Though the old-age dependency is relatively modest compared to other economies, the inflationary in PICs can be attributed to the rise in old-age dependency, which lowers the labor supply and labor force participation. Unlike advanced economies where automation or migration can partially offset such shortages, PICs often lack these buffers, making them more vulnerable to supply-side constraints. In Addition, older individuals tend to dissave in retirement, consuming more than they produce. In PICs, where formal pension coverage is limited, this consumption is often sustained through intra-household transfers or the liquidation of personal assets. While not directly tied to government transfers, this pattern still increases aggregate demand, particularly for essential goods and services, thereby adding to inflationary pressures on the demand side. These findings hold important policy implications. First, encouraging delayed retirement and retaining older workers in the labor force could mitigate labor shortages and support productivity levels. Furthermore, reforms aimed at increasing the efficiency of healthcare delivery and ensuring the sustainability of pension systems may alleviate some of the fiscal pressures associated with demographic aging. Overall, the models' error terms with control variables are cross-sectionally independent. Hence, DCCE estimators efficiently handle the issue of cross-sectional dependence.

C. Robustness Checks

Robustness Check I (Time-trend)

In the first set of robustness checks, we introduced a time trend in our main specification. A linear time trend is incorporated to capture systematic changes in the dependent variable across periods. In line with Kónya (2006), this trend can also act as a proxy for unobserved influences that are not explicitly modeled. The time trend is initialized at 1 for 1981 and increases incrementally by one for each subsequent period.

Table 4.
Robustness Check I (Time-trend)

This table presents the results of second robustness check where we have considered time trend while examining the impact of demographic indicators on inflation. *inflation* is CPI growth rate, *work* is changing in the share of the working-age population, *ywork* is changing in the share of the young working-age population, *pwork* is changing in the share of the prime working-age population, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, and *oil* is the real oil price. Models 1, 2, and 3 investigate the impact of the share of the working-age population, the disaggregated working-age population, and old-age dependency rate on inflation respectively. a and b represent model without and with control variables, respectively. *R-square* is mean group R square and *CD* is cross-sectional dependence.

	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
c	-0.119	42.542*	-0.116	-5.786	-0.141	-24.388
	(1.229)	(13.477)	(0.746)	(23.687)	(1.194)	(30.818)
inflation(t-1)	0.104	-0.121	0.026	0.012	0.129	-0.359**
	(0.137)	(0.102)	(0.075)	(0.205)	(0.126)	(0.151)
work	-1.844***	-3.112**				
	(0.953)	(1.410)				
ywork			-1.064***	-2.859**		
			(0.637)	(1.419)		
pwork			0.160	-0.689*		
			(0.116)	(0.159)		
old					0.264*	0.542*
					(0.059)	(0.119)
output		-0.193**		-0.211*		-0.078*
		(0.095)		(0.015)		(0.029)
ms		0.126		0.069**		0.071
		(0.080)		(0.033)		(0.060)
open		4.555*		3.438*		4.200
		(0.237)		(1.088)		(3.165)
reer		2.933***		1.340		12.406
		(1.765)		(3.576)		(10.926)
oil		0.107		0.557*		0.388
		(0.666)		(0.184)		(0.563)
time_trend	-0.001	-0.062*	0.004	-0.033	-0.001	-0.097*
	(0.013)	(0.020)	(0.006)	(0.021)	(0.012)	(0.036)
R-square	0.52	0.66	0.47	0.63	0.50	0.53
CD	-3.55*	0.61	-4.06*	-0.78	-3.66*	0.04

Table 4 reports the outcomes of the first set of robustness check. The findings suggest that a larger working-age population exerts a significant downward pressure on inflation. When the working-age population is examined in a disaggregated manner, both the young and prime working-age cohorts are found to contribute significantly to reducing inflation. In contrast, the old-age dependency ratio has a significant positive effect, indicating inflationary tendencies. These patterns are consistent with the life-cycle hypothesis and reinforce our main results, confirming their robustness. Moreover, the error terms across all models, after including control variables, exhibit cross-sectional independence. This indicates that the DCCE estimators effectively address the challenge of cross-sectional dependence.

Robustness Check II (Redefined Age Structure)

As a second robustness exercise, we modified the classification of age groups to evaluate whether our results remain consistent. The working-age population was broadened to include individuals aged 15 to 64, compared to the 20 to 59 age range used in the main analysis. The young working-age group was adjusted to ages 15 to 39 instead of 20 to 39. Similarly, the prime working-age group was extended to 40 to 64 from the previous 40 to 59 range. Lastly, the threshold for the old-age population shifted from 60 and above to 65 and above. The model specifications remained consistent with the main analysis, and the corresponding results are summarized in Table 5.

Table 5.
Robustness Check II (Redefined Age Structure)

This table presents the results of first robustness check concerning impact of demographic indicators on inflation. *inflation* is CPI growth rate, *work* is changing in the share of the working-age population, *ywork* is changing in the share of the young working-age population, *pwork* is changing in the share of the prime working-age population, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, and *oil* is the real oil price. Models 1, 2, and 3 investigate the impact of the share of the working-age population, the disaggregated working-age population, and old-age dependency rate on inflation respectively. a and b represent model without and with control variables, respectively. *R-square* is mean group R square and *CD* is cross-sectional dependence. The values in the parenthesis are standard errors. *, **, and *** indicate p<0.01, p<0.05, and p<0.1, respectively.

	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
c	-0.160	-7.324*	-0.004	-17.207	-0.225	-14.023
	(0.498)	(2.616)	(0.451)	(13.577)	(0.437)	(11.884)
inflation(t-1)	0.121	0.196***	0.143	0.177*	0.119	-0.003
	(0.119)	(0.109)	(0.120)	(0.050)	(0.079)	(0.122)
work	-1.363***	-1.178***				
	(0.763)	(0.710)				
ywork			-0.478	-0.680		
			(0.406)	(1.673)		
pwork			-0.097*	-0.503*		
			(0.036)	(0.192)		
old					0.116***	0.211***
					(0.065)	(0.114)
output		-0.077***		-0.218*		-0.059*
		(0.041)		(0.056)		(0.031)
ms		0.017		0.130		0.056
		(0.058)		(0.103)		(0.046)
open		1.650*		2.530		1.510
		(0.431)		(2.567)		(1.214)
reer		7.322		1.918		7.295
		(7.485)		(1.215)		(6.841)
oil		0.550		0.464*		0.563
		(0.450)		(0.135)		(0.402)
R-square	0.48	0.27	0.49	0.61	0.46	0.42
CD	-3.56*	0.93	-3.49*	-0.51	-4.06*	0.88

The results indicate that the share of the working-age population significantly negatively impacts inflation. The disaggregated analysis reveal that only individuals in their prime working years exert a statistically significant dampening effect on inflation. The findings relating to old age dependency indicate it to be inflationary. Our results remain broadly consistent with our primary findings, except for the effect of the share of young working age population. Moreover, once control variables are incorporated, the error terms across all specifications satisfy the condition of cross-sectional independence. Hence, DCCE estimators efficiently handles cross-sectional dependence.

Robustness Check III (Remittances and Development Assistance & Aid)

In the final set of robustness checks, we have introduced remittances and net official development assistance and official aid received as control variables, considering their significant role in macroeconomic stability and dynamics in PICs. The results incorporating remittances and net official development assistance and official aid received are reported in Table 6, Panel A and B, respectively.

Table 6.
Robustness Check III (Remittances and Development Assistance & Aid)

This table presents the results of robustness check concerning impact of demographic indicators on inflation. In Panel A we have incorporated remittances as control variable and in Panel B we have incorporated Net official development assistance and official aid received as control variable in our baseline specification. *inflation* is CPI growth rate, *work* is changing in the share of the working-age population, *ywork* is changing in the share of the young working-age population, *pwork* is changing in the share of the prime working-age population, *old* is changes in old-age dependency rate, *output* is the GDP growth rate, *ms* is money supply growth, *open* in trade openness, *reer* is the real effective exchange rate, *oil* is the real oil price, rem is Remittances, and *doao* is net official development assistance and official aid received. Models 1, 2, and 3 investigate the impact of the share of the working-age population, the disaggregated working-age population, and old-age dependency rate on inflation respectively. b represent model with control variables. *R-square* is mean group R square and *CD* is cross-sectional dependence. The values in the parenthesis are standard errors. *, **, and *** indicate p<0.01, p<0.05, and p<0.1, respectively.

	Panel A: Remittances			**Panel B: Development Assistance and Official Aid**		
	Model 1b	**Model 2b**	**Model 3b**	**Model 1b**	**Model 2b**	**Model 3b**
c	-33.185*	-27.565*	-27.890*	-11.025***	-8.127**	-10.012***
	(4.658)	(8.930)	(4.409)	(6.156)	(3.684)	(5.165)
inflation(t-1)	-0.035	-0.020	0.076	0.053	0.126***	0.160*
	(0.177)	(0.150)	(0.140)	(0.192)	(0.066)	(0.058)
work	-3.788*			-3.769***		
	(1.417)			(2.065)		
ywork		-2.399**			-0.902***	
		(1.113)			(0.540)	
pwork		-0.447**			-0.223***	
		(0.214)			(0.135)	
old			0.450*			0.173***
			(0.142)			(0.094)
output	-0.097*	-0.057*	-0.102**	-0.121*	-0.053	-0.064***
	(0.020)	(0.021)	(0.047)	(0.019)	(0.042)	(0.033)

Table 6.
Robustness Check III (Remittances and Development Assistance & Aid) (Continued)

	Panel A: Remittances			Panel B: Development Assistance and Official Aid		
	Model 1b	**Model 2b**	**Model 3b**	**Model 1b**	**Model 2b**	**Model 3b**
ms	0.025	0.029	0.076	0.045*	0.066	0.005
	(0.034)	(0.044)	(0.055)	(0.011)	(0.060)	(0.045)
open	0.217	0.077	0.146	0.797	-0.088	-0.642
	(0.590)	(0.582)	(0.590)	(0.623)	(0.549)	(0.641)
reer	10.366***	8.537	8.216	10.781	4.517	5.827
	(6.167)	(6.438)	(6.274)	(7.826)	(4.456)	(5.068)
oil	0.091	0.048	-0.097	0.330	-0.280	-0.398**
	(0.469)	(0.515)	(0.281)	(0.451)	(0.202)	(0.180)
rem	-0.223	-0.041	-0.158			
	(0.196)	(0.029)	(0.140)			
doao				-0.001	-0.005**	-0.002
				(0.003)	(0.002)	(0.002)
R-square	0.22	0.20	0.30	0.25	0.50	0.55
CD	-0.15	0.75	0.05	0.56	1.52	0.87

The results indicate that the working age exerts disinflationary pressure in both the specifications (see Panel A and B of Table 6). With respect to disaggregated working age, we find that young working age has a relatively higher negative impact on price level compared to prime working, albeit both are significant in both specifications. The findings in the case of PICs can be attributed to the largest cohorts in recent years entering working age and contributing to the labor supply pool, lowering the cost of production, especially in informal sectors of PICs where the wages are not sticky. Finally, we find that old dependency to be inflationary. Our findings incorporating remittances and net official development assistance and official aid received as control variables are consistent with our main findings. Hence, robust. All the model specifications are cross-sectionally independent as DCCE efficiently handles the cross-sectional dependence.

IV. CONCLUSION

Several studies have explored various factors influencing inflation in PICs. Bai (2016) examined the impact of commodity price shocks and exchange rate volatility, while Jayaraman and Choong (2011) investigated the role of exchange rate fluctuations in shaping inflationary dynamics. Narayan *et al*. (2023) recently identified that an economic agent's expectation can explain 85 percent of inflation in Fiji. Hence, this study contributes to the growing literature on inflation in the case of PICs by investigating the impact of changing age structure on inflation. We have considered the sample of six PICs conditioned to the availability of data. The findings reveal that both aggregated and disaggregated shares of the working-age population exert disinflationary pressures. These results are consistent with the life cycle hypothesis, which posits that individuals in their working years tend to save and produce more than they consume, thereby contributing to economic stability and lower inflation. Conversely, the results indicate that old-age dependency exerts inflationary pressures in PICs, attributed to demands and lowering labor force. The findings offer valuable insights for policymakers in PICs. The policies should focus on enhancing the working-age population's participation and productivity, which can amplify price stability. Further, delayed retirement and flexible work arrangements for older individuals to extend their participation in the labor force. The limitation of the study is that it does not account for sectoral absorption patterns or labour reallocation across agriculture, services, and industry, which can significantly mediate the relationship between demographic changes and inflation. Future research could incorporate structural transformation indicators and migration flows as moderating variables to better capture the dynamics of inflation in the context of demographic shifts in PICs.

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