Does Maternal Employment Impair Child Growth? Evidence from Indonesia

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Abstract

Due to time constraints, mothers' working may influence their child's growth positively or negatively. However, previous studies have shown that the net effect remains varied. This study expands the limited literature in Indonesia, utilizing the last three waves of the IFLS as primary data by exploring maternal working status in the present and past, specifically during the child's critical window, to see whether the results diverge. We overcome the potential endogeneity in mothers' working status by using the number of small industries and cluster average of women's employment rate in the subdistrict as instruments. Results show that the present working status does not affect the child's growth. However, pregnant mothers' employment has adverse effects on their children. Moreover, the detrimental impact of past working status also occurs in rural areas and, interestingly, in the upper 60% of households. This confirms that the effect does differ in each time frame.

Keywords: Maternal Working Status, Child's Growth, Stunting, Instrumental Variable

JEL Classification: C26, I15, J22

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I. Introduction

Stunting is a critical issue that has become a global health priority (de Onis & Branca, 2016) since it depicts long-term, irreversible nutritional deprivation, thus carrying various detrimental repercussions throughout their life cycles. Prendergast & Humphrey (2014) demonstrate that children with stunting are exposed to a high risk of morbidity and mortality from infections. When entering school age, stunted children tend to have poorer cognitive performance and lower educational attainment and enrollment (Grantham-McGregor et al., 2007; Martorell & Nguyen, 2010). Furthermore, their labor productivity is more likely to be disrupted, thus negatively affecting the wage received (Case & Paxson, 2008; McGovern et al., 2017; Thomas & Strauss, 1997).

The adverse effects of stunting have encouraged researchers to investigate the pathways that could influence it. Existing literature shows that the problem of stunting is multidimensional, where the determinants range widely, from poverty (Siddiqui et al., 2020), food insecurity (Baig-Ansari et al., 2006; Maitra, 2018), and family-related factors (Reyes et al., 2004), to infection (Bardosono et al., 2007; Millward, 2017), drinking water source and sanitation (Chambers & Medeazza, 2013; Cumming & Cairncross, 2016; Kwami et al., 2019), and access to health care (Beal et al., 2018).

Among the numerous factors, it is worth noting that the mother holds an essential role in preventing her child from stunting, since she is the one who carries the fetus and generally takes care of the child after birth most of the time rather than her spouse. During pregnancy, maintaining maternal health and ensuring adequate nutritional intake are two decisive aspects of fetal development. Barker's hypothesis (1995) emphasized that undernutrition in utero permanently alters the body's structure, resulting in disease onset later in life. However, after birth, the child still experiences rapid and sensitive growth in the first two years, which is also driven by nutritional sufficiency (Cusick & Georgieff, 2016). This period is considered a critical window, as the determination of stunting often lies in the first 1000 days of a child's life (Georgiadis & Penny, 2017).

In the family, as is the case for men, their wives also have the right to work. It is shown that women's labor force participation has increased over the last few decades (Goldin, 2006).

Yet, the gender wage gap remains (Blau & Kahn, 2017). One potential channel that could explain this is the child's existence. Compared to men or to women without children, women with children tend to lower their labor supply per week (Goldin, 2014). Consequently, they encounter a significant decline in their income, starting after their first child's birth, while men are unaffected (Kleven et al., 2019). This is called a child penalty. These labor supply changes can be seen as part of the mother's responsibility to care for her child. However, social norms and traditional views of gender roles might also affect this decision, where men are typically the primary breadwinners (Blau & Kahn, 2017), and their wives have dominant responsibility in nonmarket activities (Becker, 1991).

Apart from the possibility of labor supply adjustment, maternal participation in the labor force has two potential effects on their child's growth. On the one hand, working mothers bring additional income to the family that could be allocated to provide nutritious food and improve child health (income effect) (Hosen et al., 2023). On the other hand, working mothers have less time to supervise and care for their children, such as breastfeeding, preparing nutritious food, and attending a healthcare facility (substitution effect) (Jakaria et al., 2022). One might argue that the mother's role when absent could be replaced by other household members as substitute caregivers. Nevertheless, there is a chance that their knowledge and ability to care for the children are varied and limited (Brauner-Otto et al., 2019). That said, the net effect remains uncertain.

A relatively high burden of stunting is commonly found in low- and middle-income countries. According to a recent survey from the Health Development Policy Agency (2022), Indonesia's stunting prevalence has fallen significantly, from 37.6% in 2013 to 21.6% in 2022. Despite this considerable reduction, Indonesia's standing remains the second lowest among Southeast Asian countries (ADB, 2023). This implies that efforts are still needed to combat the problem of stunting in Indonesia.

Furthermore, women's involvement in the formal and informal work sectors in Indonesia is considerably lower than men's (BPS, 2023). The difference is more substantial in the formal sector, with a percentage of 65.9% for men and 34.1% for women. These underrepresented women in the labor force might contribute to the wage disparities between genders. Nationally, current data for 2023 shows that women earn 33% less in wages than men (BPS, 2023). This provides a signal that a child penalty might exist as a result of women adjusting their labor supply to accommodate the needs of childbearing and childrearing, contributing to a widening gender wage gap. Therefore, understanding the dominant effects of

maternal employment on a child's growth is crucial, as this can be a consideration for the government to formulate targeted policies that address both child penalty and child growth issues.

Previous studies have shown mixed results in uncovering the influence of maternal employment status on a child's growth, whether it is statistically insignificant (Lamontagne et al., 1998; Tucker & Sanjur, 1988), positive (Dervisevic et al., 2021; Diiro et al., 2017; Ukwuani & Suchindran, 2003; Ulijaszek & Leighton, 1998), or negative (Abbi et al., 1991; Glick & Sahn, 1998; Hosen et al., 2023; Jakaria et al., 2022; Laksono et al., 2022; Rabiee & Geissler, 1992; Sivakami, 1997; Toyama et al., 2001). There might be a possibility that such different effects across countries are due to the unique conditions of women's labor force participation and the stunting prevalence. Nonetheless, most studies do not consider potential endogeneity in the mother's working status that might affect the estimation result. Additionally, to the best of our knowledge, there are limited studies that focus on this issue within the context of Indonesia.

This study tries to expand the existing body of literature that examines the effect of maternal participation in the labor market on child growth. While most of the studies only look at the employment status in the past 12 months preceding the survey time, this paper is concerned about the past working status during the critical window of the child to expose possible different effects in each period. In addition, heterogeneity analysis between residential status and economic levels is also conducted to see whether the results diverge. The research intends to yield more detailed explanations of potential mechanisms in each analysis section in Indonesia by utilizing the Indonesian Family Life Survey (IFLS) data in 2000, 2007, and 2014 as a primary dataset.

The estimation results show that mothers' employment in the past 12 months has no statistically significant impact on their child's growth. This is also consistent with the heterogeneous effects of residential status and economic levels. However, when the analysis is varied to the stages of a child's critical window, mothers' working during pregnancy negatively impacts their child's growth. Such adverse effects of employed mothers also appear in rural areas and in the upper 60% of economic levels, specifically for those who constantly work for two years after birth and when they have children aged one to two years. Several potential mechanisms could explain the detrimental effect of working mothers on a child's growth in the critical window. This will be discussed further in the results section. Apart from that, this study

corroborates that mothers' working status timing does matter to understand the effect comprehensively.

II. Literature Review

Attention to the relationship between women's labor participation and children's growth has been growing for several decades, especially in developing countries. With the emergence of interest in the HAZ (height-for-age *z* score) as one of the anthropometric measurements, Tucker & Sanjur (1988) empirically offer an early debate on this issue. Using primary data in Panama, they found that employed mothers have no statistically significant effect on the child's HAZ score. However, the children benefit in terms of dietary intake, probably due to additional income in the household such that the mother can supply a greater quantity and quality of food. Building upon this research, Lamontagne et al. (1998) also found a similar result.

Nonetheless, other studies have yielded significant yet mixed results. Utilizing Nigerian Demographic and Health Surveys (NDHS), Ukwuani & Suchindran (2003) divided mothers' working status into several categories that might affect their children's nutritional status differently. During childhood, when women work for income and bring their children to work, this lowers the probability of stunting. The positive effect is reinforced by Ulijaszek & Leighton (1998), who showed that children from impoverished Indian families and refugees from Bangladesh benefited from having working mothers due to the need for additional nutritional intake.

In contrast, Abbi et al. (1991) highlight that in India, children under and above 36 months with working mothers are at a higher risk of having a low HAZ. Within the same country, Sivakami (1997) supports these findings and provides a potential explanation for the adverse effect: employed mothers spend less time in childcare, resulting in shorter duration for breastfeeding. In rural Iran, Rabiee & Geissler (1992) demonstrate that the negative effect of maternal employment is not directly due to the financial aspect but could be explained through the child's food consumption and health mechanisms. Unfortunately, most previous research on maternal employment and children's growth did not consider endogeneity in the decision to work, which might affect the estimation result.

Glick & Sahn (1998) pioneered the consideration of endogeneity issues. Using instrumental variables, they found that in West Africa, the more the mothers allocate their time to working activities, the more their children will experience a decrease in HAZ, though the effect is relatively small. With the same approach in the context of South Asian countries, Jakaria et al. (2022) and Hosen et al. (2023) also found similar results, showing a significantly

higher impact on HAZ and stunting outcomes. However, Diiro et al. (2017) discovered different results when analyzing the distribution of HAZ scores into quantiles. They found that maternal labor participation positively affects their child's growth, particularly in the lower quantiles.

In the case of Indonesia, there is a limited body of literature on maternal employment and children's health. An earlier study conducted in Surabaya by Toyama et al. (2001) found that children of employed mothers had considerably lower HAZ scores than those of non-working mothers. This result aligns with a more recent study by Laksono et al. (2022), which demonstrates that children with working mothers living in rural areas are at a higher risk of stunting. In contrast, using a quasi-experimental method, Dervisevic et al. (2021) found a positive effect on the child's growth. Nevertheless, the study by Toyama et al. (2001) might not be generalizable since the survey is specific to certain areas, and the first two empirical studies do not account for potential endogeneity issues. Additionally, Dervisevic et al. (2021) focus on children aged six to 18, who are not in the critical window and may not require as much attention as children under five. These findings underscore the need for more comprehensive studies in Indonesia to fill existing gaps in the literature and contribute to exploring variations in maternal working status that previous studies have not thoroughly examined.

III. Data and Empirical Approach

3.1. Data

This study utilizes the Indonesian Family Life Survey (IFLS) as a primary dataset. The IFLS is a longitudinal survey in Indonesia that depicts socioeconomic and health facets, representing approximately 83% of the population in 13 out of 26 provinces in the initial survey. There are a total of five survey waves from 1993 to 2014. In this research, we only used the past three survey waves (IFLS 3, 4, and 5), made into pooled cross-sectional data to increase the sample size, thus producing more robust estimates. These wave selections are suitable with other data sources used in the research and have to be merged within the relatively same survey year.

The unit of observation in this study is at the individual level, specifically children aged 0-60 months who at least cohabitate with their mother. Since the number of samples of children under five is relatively limited compared to older generations, appending samples from another IFLS wave is desired. This yields a total of 9,211 individual observations from 6,609 households. When the waves are combined, no children are double-recorded in the total

samples used in the analysis, because the survey years in each wave were around seven years apart.

The outcome of interest is child growth based on an anthropometric measurement: the HAZ score according to the WHO standards. Besides that, the probability of stunting (HAZ < -2) is also included in the analysis. The argument for choosing these measurements is the long-term detrimental effect of stunting, which is irreversible and different from other indicators, such as wasting and underweight, that tend to be treatable. Since the determinants of stunting start in utero, the sample is restricted only to the biological children in the household. Other statuses, for instance, stepchildren and adopted children, are dropped because these would affect the estimation results.

The primary independent variable is the mother's working status in the past 12 months preceding the survey, retrieved from Book K. The same variable has been commonly used in the previous literature. However, to ensure that the mother is still considered to be in the reproductive period, the sample chosen is only those who are 15-64 years old. As part of the contribution, this study exploits different working status timing in the first 1000 days of the child's life, as this strongly determines the possibility of stunting. Therefore, we take advantage of the mother's past employment status from Book 3A, which could be linked with the child's critical window.

This study also used Potensi Desa (Podes, Village Potential) from the Indonesian Central Bureau of Statistics as complementary data to harness exogenous variation in the area. The Podes data consists of various village characteristics, such as socio-economic and infrastructure, and the survey is conducted in over 60,000 villages every several years. There are three periods of Podes data that correspond to the IFLS waves (2000, 2008, and 2014). However, due to the absence of the village codes in the IFLS, these two datasets could only be merged at the subdistrict level.

Four types of covariates are included in the analysis: child, parental, household, and community characteristics. Child characteristics consist of the child's age (in months), gender, birth order, low birth weight (< 2,500 grams), preterm birth (< 37 weeks), exclusive breastfeeding, and multiple births. Parental characteristics include the mother's age, height, years of education, number of prenatal visits according to the WHO standards, and whether the father smokes. Household characteristics incorporate the number of children under 15 years, per capita expenditure (expressed in the natural logarithm form), clean drinking water source, having own latrine, having a servant, type of wall and floor, number of other adult women, and

whether the household has savings. An additional community characteristic is the number of *posyandu* (integrated health service posts). Other than that, residential status and year-fixed effects are also considered.

Since numerous control variables are used in the study, missing values from the covariates are unavoidable. If this matter is not addressed, it will reduce the sample size significantly. Thus, the data is imputed by replacing the missing value with zero and creating the dummy variable as an indicator for the missingness to preserve the sample size. It is assumed that the missing value in the covariates is Missing Completely at Random (MCAR).

3.2. Empirical Strategy and Identification Assumption

To examine the effect of maternal employment status on child growth and see whether the substitution effect outweighs the income effect (or vice versa), an empirical model is specified as follows:

$$Y_{iht} = \alpha_0 + \alpha_1 \psi_{ht} + \gamma X_{iht} + \theta_t + \varepsilon_{iht}$$

where Y is the nutritional (or growth status) of child i at household h in period t. In the context of this study, the nutritional status is the child's HAZ score and probability of stunting. The main independent variable (ψ) is the mother's working status. The vector of covariates (X) incorporates child, parental, household, and community characteristics. Other than that, the year fixed effect (θ) is also controlled in the regression. Lastly, (ε) refers to the error term.

The main analysis of the research is maternal working status in the past 12 months preceding the survey. In addition, to disentangle potential different effects and magnitude, this study varies the mother's past working status in the first 1000 days of a child's life (critical window), divided into four timeframes: working status while pregnant, with 0-1-year-old child, with 1-2-years-old child, and always working for two years after birth. From all of these variations, including the heterogeneous effects, the standard errors are clustered at the community (village) level to account for correlations within the same areas.

Using the econometric specification above will lead to biased estimation due to endogeneity in the maternal working status. There are two potential sources of endogeneity: reverse causality and omitted variable bias. The reverse causality issue might arise due to the child's health condition that influences the mother's decision to work. For instance, in an impoverished household that faces financial constraints, a poor child's health condition might encourage the mother to work to increase the income in the family. Hence, she can provide

more nutritious food. The relationship between a child's health and maternal employment status is considered complex and potentially bidirectional.

Several latent factors might affect the outcome of interest and the independent variable. The first is related to the mother's preference or motivation to work. Mothers with specific career goals would be highly motivated and possibly allocate more time to work, meaning there is less time to care for their children. Second, spouses, specifically mothers, may have preferences in how they ensure the quality of caring for their children. Parents may treat their children differently across households according to their parenting style and knowledge of childrearing, which is unobservable. One could argue that childrearing knowledge could be proxied by years of education. However, this cannot fully capture the specific knowledge related to children, although it is also included in the covariates. Third, household bargaining power between spouses may influence maternal employment decisions. Mothers with higher bargaining power play a significant role in determining various choices in the household, one being work decisions.

Considering endogeneity in maternal employment status, we use a quasi-experimental approach, specifically instrumental variables, by exploiting exogenous variation and inferring the causal effect of working mothers on a child's growth. The study used two instruments: the number of small industries in the area based on our construction, and the cluster average of women's working status following Lenze & Klasen (2017) and Rashad & Sharaf (2019). The two-stage procedure is as follows:

$$\psi_{ht} = \beta_0 + \beta_1 NumIndust + \beta_2 ClusterAvg + \zeta X_{iht} + \theta_t + \epsilon_{iht}$$

$$Y_{iht} = \delta_0 + \delta_1 \widehat{\psi_{ht}} + \eta X_{iht} + \theta_t + \vartheta_{iht}$$

The number of small industries is taken from Podes data in each period. Several industries are listed in each village: leather, wood, metal, weaving, pottery, fabric, and food and beverages. Based on that, we combine all sectors to obtain the total industries within each subdistrict. The decision to aggregate the number of industries at the subdistrict level is because people can still easily commute to relatively close areas to work rather than just within the village. Moreover, there is a limitation in merging the data with IFLS since the village codes are unavailable, as mentioned above in the data subsection. Due to the presence of extreme outliers in the data, we decided to transform the data using a squared root, and the remaining outliers are winsorized to 95% of the distribution. This instrument is expected to be positively related to the maternal working status since the presence of many small industries in a particular area indicates ample job opportunities, which could influence the mother's decision to work.

Meanwhile, following Lenze & Klasen (2017) and Rashad & Sharaf (2019), the cluster average of women's working status instrument is constructed in a particular area, excluding mother samples used in the study to avoid in-built association. In line with the first instrument and the research design, the cluster average of women's working status is also established at the subdistrict level. The rationale for choosing this instrument is that it depicts the prevailing conditions of the local labor market and the need for labor, specifically for women (Rashad & Sharaf, 2019).

After potentially satisfying the relevance assumption of the instrumental variable, the exclusion restriction also needs to be fulfilled by ensuring that the two instruments only have an indirect effect on the outcome through the endogenous variable and not directly. We argue that the number of small industries in subdistricts is less likely to directly impact the growth of a mother's own children. This is because small industries primarily offer job opportunities within the local area and will only affect the child's growth if the mother works there and starts earning income to provide food for their child. Moreover, since the scope of the industry is small, it might not contribute significantly to community programs related to health or healthcare that possibly directly affect the child's growth.

Shifting to the second instrument, the peer-women employment rate in the subdistrict is also unlikely to directly affect the child's growth. It is considered an external factor to mothers and families since it is only determined by the local economic situation (Rashad & Sharaf, 2018). The mother used in the sample could not alter the women's employment rate in the subdistrict, and her participation in the labor force also would not change the employment rate since she is excluded from the calculation. Overall, the two instruments used in the study have several limitations that will be discussed in the last section. The limitation arises since finding instruments suitable with all of the research designs in this paper is challenging.

IV. Results and Discussion

4.1. Descriptive Statistics

Table 1. Descriptive Statistics for Overall Sample

	Obs	Mean	Std. Dev.
HAZ score	9,211	-1.477	1.552
Stunting [d]	9,211	0.369	0.483
Work this year [d]	9,211	0.476	0.499
Work while pregnant [d]	7,752	0.450	0.498
Work while child 0-1 year [d]	8,028	0.425	0.494
Work while child 1-2 years [d]	6,703	0.459	0.498
Work always for two years after birth [d]	5,926	0.448	0.497

Monthly present working hours	4,072	162.0	101.1
Working field (categorical)	4,072	5.024	2.981
Child's age (months)	9,211	30.80	17.75
Child's gender (= 1 if male) [d]	9,211	0.522	0.500
Birth order	9,211	2.116	1.269
Low birth weight (<2.5 kg) [d]	7,459	0.0656	0.248
Premature birth (<37 weeks) [d]	8,228	0.724	0.447
Exclusive breastfeeding [d]	8,001	0.149	0.356
Twin births [d]	8,268	0.0385	0.192
Mother's age	9,211	30.12	6.131
Mother's height	9,096	151.4	5.407
Mother's years of schooling	9,117	9.079	3.884
Prenatal visit (WHO standards) [d]	7,924	0.258	0.438
Smoking father [d]	8,163	0.714	0.452
Num of children under 15	9,211	2.012	0.993
Per capita expenditure (PCE)	9,211	599,904	615,017
Log PCE	9,211	12.92	0.893
Clean drinking water [d]	9,211	0.913	0.282
Has own latrine [d]	9,211	0.632	0.482
Have servants [d]	9,211	0.0117	0.108
Has saving [d]	9,211	0.297	0.457
Floor-type from ceramic/tiles/cement [d]	9,211	0.811	0.391
Wall type from masonry [d]	9,211	0.710	0.454
Num of other adult women in the HH	9,211	0.507	0.964
Live in urban [d]	9,211	0.545	0.498
Num of posyandu	8,500	7.552	6.400
Num of small industry (sqrt)	9,211	17.07	12.25
Cluster average of women working status	9,211	0.544	0.207

Note: Superscript [d] indicates a dummy variable.

Source: Author's calculation from IFLS 3, 4, & 5 and Podes 2000, 2008, & 2014

Table 1 provides descriptive statistics for the overall sample used in the study. It reveals that approximately 37% of children under the age of five are stunted, and the HAZ score is also relatively low, with values close to the stunting threshold. In contrast, when examining hygiene indicators, access to clean drinking water sources is very high, almost 100%. However, the score for household ownership of sanitary facilities is not as high as that of clean drinking water sources. Observing the variable of interest, it can be seen that less than 50% of mothers participate in the labor force in every time frame of the analysis. Furthermore, compared with working status in the past 12 months, some mothers make slight adjustments to their working status while pregnant and when they have children aged 0-1 year. This might indicate the need to care for themselves and the child in the initial phase of a child's life. The labor force participation increases slightly when the child turns 1-2 years old.

For a more detailed summary, Appendix 1 offers the mean differences in maternal working status in the past 12 months. There is no significant difference in HAZ score and stunting between working statuses. Furthermore, the mothers' decision to work could be explained by the number and age of the children rather than non-working mothers. Employed mothers have more children under 15, indicating the need for additional income sources since

there are more mouths to feed. Their children under five are also significantly older than those of non-working mothers, which shows that the child might be old enough to be delegated to alternative caregivers in the household. This is also related to the higher percentage of having servants and the number of other adult women in the family for working mothers to ensure the availability of caregivers. As a result, the per capita expenditure of employed mothers is higher than that of non-working mothers since they receive additional income and their savings are also increased.

When the summary is stratified by economic levels, a significant disparity is observed in the prevalence of stunting and the HAZ score (see Appendix 2). The bottom 40% of groups exhibit higher stunting prevalence and lower HAZ scores. This might be closely related to poor environment and hygiene. Families in the bottom 40% have lower access to clean drinking water sources. Moreover, there is a substantial discrepancy in sanitary facilities, particularly among the bottom quintiles, where the ownership rate is 45.7%, in contrast to the upper quintiles, with a rate of 74.8%, resulting in a difference of 29.1% between the two economic groups. They also have fewer health facilities. These factors might influence the higher prevalence of stunting in the bottom 40% of families.

On the other hand, households in the bottom quintiles have a significantly higher number of children under 15 compared to the upper quintiles. Given their financial constraints, this implies that they may need to distribute food among a larger number of children. One way to overcome this issue is to give the mother a chance to work to earn additional income. However, it turns out that the labor force participation is significantly lower than in families in the upper quintiles. This might be due to the low educational attainment in the bottom quintiles, thus limiting their opportunity to work. As a further consequence, they also have less savings compared to the upper quintiles.

4.2. Main Findings

This subsection presents and discusses the estimates of working status in the past 12 months and previous working status divided into four time frames: working while pregnant, 0-1-year-old child, 1-2-years-old child, and always working for two years after birth. Since the primary independent variable is the past 12 months working status and using the instrumental variables method, the first-stage regression result can be seen in Table 2. The result shows that the two instruments are good predictors of mothers' working status, with a statistically significant relationship on each instrument. Positive signs also correspond to our expectations mentioned

in the empirical strategy. The most important thing is that the F-Statistic of the first-stage regression is above 10, surpassing the rule of thumb.

Table 2. First-Stage Regression

	Dependent: Mother's working status (in the past 12 months)
Num of small industry (sqrt)	0.00156**
	(0.000633)
Cluster average of women working status	0.391***
	(0.0392)
Control variable	**Yes**
Observations	9211
F-Stat	23.35

Note: Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression, starting from child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. The two instruments are constructed at the subdistrict level. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Source: Author's calculation

Table 3 shows the estimation of the primary independent variable: working status in the past 12 months. Each column refers to (1) OLS, (2) 2SLS, and (3) IV Probit. It can be seen that the OLS coefficient is underestimated due to the endogeneity issue. HAZ score shows a negative coefficient and a positive one for the probability of stunting. However, it is statistically insignificant, meaning working mothers do not affect their child's growth. This result is in line with Tucker & Sanjur (1988), Lamontagne et al. (1998), and Brauner-Otto et al. (2019) but is in contrast to recent studies that also use the IV approach. Jakaria et al. (2022) and Hosen et al. (2023) showed statistically significant adverse effects of working mothers on HAZ score and probability of stunting.

Table 3. Estimates of Mother's Working Status in the Past 12 Months

	(1)	(2)	(3)
	OLS	2SLS	IV Probit
	HAZ score		Stunting
Mother's working status	-0.0286	-0.284	0.0537
	(0.0359)	(0.204)	(0.0676)
Control variable	**Yes**	**Yes**	**Yes**
Observations	9211	9211	9211

Note: Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression: child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. Marginal effects are presented for the probability of stunting in IV probit regression. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Source: Author's calculation

There are two possible explanations for the statistically insignificant estimates. First, working mothers bring additional income to the household to provide nutritious food in terms of quantity and quality. While working, mothers may rely on alternative caregivers to care for

their children. However, the temporary substitution is insufficient to positively affect their child's growth, as seen from the negative coefficient above. At the same time, the mother's absence at home while working is compensated by the income. Thus, it does not adversely affect their child's growth. This argument is supported by Tucker & Sanjur (1988), who show an improvement in children's dietary intake for working mothers. Second, the regression of working status in the past 12 months consists of children under five. That said, some children are no longer in the critical window (already three to five years old). This could affect the estimation result, since older children might have recovered from nutritional deficiency in the previous period (Brauner-Otto et al., 2019).

Table 4. Estimates of Present Mother's Labor Supply

	(1) OLS	(2) 2SLS	(3) IV Probit
	HAZ score		Stunting
Mother's working hours	-0.00025	0.0043	0.0001
	(0.00023)	(0.0032)	(0.0011)
Control variable	**Yes**	**Yes**	**Yes**
Observations	4072	4072	4072
First-Stage F Stat	-	13.65	-

Note: Working hours are transformed into monthly units by multiplying weekly working hours by four. Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression: child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. Marginal effects are presented for the probability of stunting in IV probit regression. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Source: Author's calculation

In Table 4, we provide additional analysis as a further exploration for working mothers to see whether increasing working hours could adversely or positively affect the child's growth. To account for potential different effects between sectors, we included the working field in the covariates as a categorical variable. It can be seen that the coefficient is small. However, the estimates did not show significant results, as the working participation above predicted. This emphasizes that present working activities do not affect a child's growth.

Table 5. Estimates of Past Working Status

	Work while pregnant			Work while child 0-1 year old		
	(1) OLS	(2) 2SLS	(3) IV Probit	(4) OLS	(5) 2SLS	(6) IV Probit
	HAZ score		Stunting	HAZ score		Stunting
Mother's working status	-0.0503	-0.462**	0.0804	-0.0333	-0.338	0.0682
	(0.0388)	(0.221)	(0.0706)	(0.0401)	(0.223)	(0.0739)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	7752	7752	7752	8028	8028	8028
First-Stage F Stat	-	23.38	-	-	24.35	-
	Work while child 1-2 years old			Always worked for two years		
	(7) OLS	(8) 2SLS	(9) IV Probit	(10) OLS	(11) 2SLS	(12) IV Probit
	HAZ score		Stunting	HAZ score		Stunting

Mother's working status	-0.00280	-0.302	0.0730	-0.0223	-0.288	0.0623
	(0.0369)	(0.208)	(0.0733)	(0.0403)	(0.210)	(0.0739)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	6703	6703	6703	5926	5926	5926
First-Stage F Stat	-	20.98	-	-	22.66	-

Note: Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression: child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. Marginal effects are presented for the probability of stunting in IV probit regression. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author's calculation

Table 5 presents the effect of past working status on children's growth in four different time frames. It shows that all of the coefficients are negative, and interestingly, the results are decaying over time, starting from -0.462 to -0.288 for the HAZ score, and only working mothers' status while pregnant is statistically significant. This negative effect is in line with Brauner-Otto et al. (2019) under the same time frame for working mothers while pregnant in terms of HAZ score. However, the coefficient is larger in this study, where mothers' employment while pregnant leads to a decrease in their child's HAZ scores by 0.462 standard deviations relative to non-working mothers and is statistically significant at the 5% level.

There are two potential explanations that might affect the child's growth in utero for working mothers. First, working mothers may face stressful conditions due to the workload, and such biological mechanisms might link maternal stress and the fetus's nutritional channel. One example is exposure to excess glucocorticoids (Barker, 1995). The adrenal cortex produces cortisol or glucocorticoids hormones, which can also be called "stress hormones" since they play a role in the physiological response to stress and anxiety and are found in higher than usual concentrations in people who are under more stress (van Eck et al., 1996; Wüst et al., 2000). During gestation, cortisol plays an essential part in fetal programming (Aizer et al., 2016), and any level of stress could negatively affect the pregnancy outcome (Lobel, 1994), with types of stress ranging from psychosocial to pregnancy-specific (Lobel et al., 2008). Several pregnancy and birth complications are associated with prenatal stress, such as preterm labor, preterm delivery, low birth weight, shortened gestational length, pre-eclampsia, and gestational diabetes (Coussons-Read, 2013). Although the effect of prenatal stress differs by its level, even less severe stress seems to elevate the risk of low birth weight (Wadhwa et al., 1993; Williamson et al., 1989), which contributes to the determinants of stunting. Second, a high workload might drive mothers to change dietary choices, such as eating less or consuming less nutritious food, thus leading to nutritional deficiency in their fetuses.

4.3. Heterogeneous Effects

Table 6 presents the estimation result for heterogeneous effects of working status in the past 12 months by residential status and economic levels. It can be seen that none of the estimates are statistically significant in 2SLS and IV Probit, confirming the consistency of the result in the primary analysis in Table 3, where the effect is also insignificant. The same insignificant results also occur for all heterogeneous effects of past working status, specifically for mothers working while pregnant and having a child 0-1 year old.

Table 6. Heterogeneous Effects of Working Status in the Past 12 Months

	By Residential Status					
	Urban			Rural		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	IV Probit	OLS	2SLS	IV Probit
	HAZ score		Stunting	HAZ score		Stunting
Mother's working status	0.0189	-0.217	-0.0214	-0.0717	-0.296	0.0972
	(0.0469)	(0.344)	(0.110)	(0.0559)	(0.216)	(0.0710)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	5020	5020	5020	4191	4191	4191
First-Stage F Stat	-	11.21	-	-	23.31	-
	By Economic Levels					
	Bottom 40%			Upper 60%		
	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	2SLS	IV Probit	OLS	2SLS	IV Probit
	HAZ score		Stunting	HAZ score		Stunting
Mother's working status	-0.100*	-0.308	0.108	0.0120	-0.258	0.0255
	(0.0546)	(0.292)	(0.0989)	(0.0431)	(0.269)	(0.0850)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	3684	3684	3684	5527	5527	5527
First-Stage F Stat	-	16.33	-	-	14.27	-

Note: Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression: child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. Marginal effects are presented for the probability of stunting in IV probit regression. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author's calculation

When the heterogeneous effects focus on the child's critical window, it is found that there are adverse effects of working mothers who live in rural areas, specifically for mothers employed while having children 1-2 years and constantly working for two years after birth (see Table 7). The result is in line with Jakaria et al. (2022). However, the difference is that they estimate the heterogeneous effects of maternal working status in the past 12 months, and the outcome is the HAZ score. On the other hand, the significant result in this study refers to the stunting outcome, and the variable is past working status. In this case, working mothers with a child aged 1-2 years who live in rural areas increase the probability of stunting by 13.5 percentage points relative to non-working mothers. This difference is statistically significant at the 10% level. The same result also happens for mothers working two consecutive years after birth, with a slightly lower probability.

These detrimental effects might be explained by the wage differential by residential status, where the income earned in rural areas is generally relatively lower than in urban areas.

The additional income from working mothers may be insufficient to offset the reduced time in child care. On the other hand, the disparity in health facilities may also contribute to this negative impact, particularly in rural areas where the number of health facilities available may not be as many as in urban areas.

Table 7. Heterogeneous Effects of Past Working Status (by Residential Status)

	While Children 1-2 Years					
	Urban			Rural		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	IV Probit	OLS	2SLS	IV Probit
	HAZ score		Stunting	HAZ score		Stunting
Mother's working status	0.0639	-0.125	-0.0457	-0.0721	-0.294	0.135*
	(0.0479)	(0.316)	(0.118)	(0.0563)	(0.213)	(0.0717)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	3639	3639	3639	3064	3064	3064
First-Stage F Stat	-	11.39	-	-	19.87	-
	Always Work for 2 Years					
	Urban			Rural		
	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	2SLS	IV Probit	OLS	2SLS	IV Probit
	HAZ score		Stunting	HAZ score		Stunting
Mother's working status	0.0515	-0.228	-0.0561	-0.103	-0.240	0.126*
	(0.0514)	(0.304)	(0.117)	(0.0624)	(0.213)	(0.0718)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	3207	3207	3207	2719	2719	2719
First-Stage F Stat	-	13.21	-	-	19.64	-

Note: Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression: child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. Marginal effects are presented for the probability of stunting in IV probit regression. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author's calculation

There are interesting results in the last heterogeneous effects of past working status by economic levels (see Table 8). Within the relatively same time frame of working status as the residential status above, the adverse effect of working mothers on children's growth in terms of HAZ score happened in the upper 60% of the household distribution. The results also align with Jakaria et al. (2022), but this study yields a lower effect. Again, the difference is in the maternal working status timing, where they only focus on the past 12 months.

Table 8. Heterogeneous Effects of Past Working Status (by Economic Levels)

	While Children 1-2 Years					
	Bottom 40%			Upper 60%		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	IV Probit	OLS	2SLS	IV Probit
	HAZ score		Stunting	HAZ score		Stunting
Mother's working status	-0.0717	-0.0869	0.0979	0.0345	-0.510*	0.0778
	(0.0574)	(0.267)	(0.102)	(0.0451)	(0.291)	(0.0961)
Control variable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2670	2670	2670	4033	4033	4033
First-Stage F Stat	-	12.34	-	-	14.64	-

Note: Standard errors clustered at the community level are given in parentheses. All covariates are included in the regression: child characteristics, parental characteristics, household characteristics, community characteristics, and year-fixed effects. Marginal effects are presented for the probability of stunting in IV probit regression. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author's calculation

This study found that working mothers with children 1-2 years in the upper 60% of households decrease their child's HAZ score by 0.510 standard deviations relative to non-working mothers. It is statistically significant at the 10% level. The detrimental consequences of working mothers in the upper quintiles suggest that the income effect is insufficient to compensate for the mother's absence while working and relying on alternative caregivers. It is possible that the caregivers do not have the necessary skills and knowledge (Brauner-Otto et al., 2019), thus leading to adverse effects on the child's growth.

V. Conclusion

5.1. Conclusion

Apart from the complexity and detrimental effects of stunting, the maternal role is essential in preventing their children from stunting, especially in the critical window that starts from in utero until the child turns two years old. In a traditional view of gender roles, women tend to do most activities in the household to care for their children, while men focus on income-generating activities. While this might be beneficial for the children, the labor market faces gender inequality issues where the gender wage gap arises, and one of its contributing factors is the child penalty. At the same time, when mothers decide to work while having children under five, two possible effects may occur to their child—either positive or negative—and which effect emerges remains uncertain. One might worry about the adverse impact if the children are left temporarily with alternative caregivers. Therefore, it is imperative to conduct empirical studies that uncover the net effects of working mothers.

The results of previous studies are inconclusive due to the mixed net effects. However, this might be due to the different conditions across countries. This research intends to fill the gap in the literature by examining the impact of working mothers in the context of Indonesia, which is still limited. Moreover, the analysis is also subdivided into several stages of the children's critical window, rather than just focusing on the present working status to see whether the results diverge.

This study found that a mother's being employed in the past 12 months does not significantly affect the child's growth. This is also consistent with the heterogeneous effects between residential status and economic levels, indicating that mothers can work without concerns. However, when the analysis is linked with past working status in the critical window, the estimation shows adverse effects for mothers working while pregnant. Biological mechanisms could explain this effect as being due to maternal stress or simply to the mother's

dietary choices during work time. Furthermore, mothers' working also impairs child growth, specifically for families who live in rural areas or even in the top quintiles of households.

Overall, these research findings show a negative effect of mothers' working on children's growth, specifically in the critical window. However, this does not mean the mother should not work and merely focus on their child at home. Instead, special efforts are needed to balance the two so that the gender wage gap and children's growth issues can be overcome.

5.2. Recommendations

There are several suggestions related to the findings above. First, a generous maternity leave policy is needed to ensure the mother's and fetus's health. Results show that the negative effect of mothers working while pregnant is relatively high. On the other hand, while generous maternity leave is desired, it is also essential to ensure that the implementation in the field runs as expected. That said, their rights need to be adequately fulfilled without any obstacles or anything that could harm them. Second, expanding access to social protection that focuses explicitly on the mother and child, such as the *Program Keluarga Harapan* (PKH), might be considered to address the family's basic needs. This would benefit women compelled to work because of limited resources that may affect their child's growth. Third is incentivizing the provision of high-quality and affordable childcare. This approach is needed to ensure that the quality of child care is proven and accessible to various economic strata. Lastly, promoting further education regarding the importance of adequate nutritional intake for pregnant women and their born children is also essential to ensure sufficient knowledge of the mothers.

5.3. Limitations

We acknowledge several limitations in the study. First, due to the data constraints, this research cannot extend the analysis by how long mothers work in each stage of the first 1000 days of a child's life. This kind of variable could provide a clearer picture of whether the longer the mother stays in the labor market results in more adverse effects on the child's health (or vice versa) as a follow-up to previous estimations conducted in the analysis section above.

Second, the instrument of number of small industries has become less accurate when analyzing past maternal employment status. This is because the instrument was recorded in the survey period, whereas employment status is retrieved for several years from past information in the survey. The variable most relevant to the instrument is working status in the past 12 months, considering the two datasets were fielded in a relatively equivalent period. Nevertheless, small industry numbers are potentially under-reported. There might be more

industries in the subdistrict but not recorded or fewer due to the dynamic conditions of small enterprises.

Third, the cluster average of women's working status does not reflect actual labor market conditions in the subdistrict population, since the instrument is formulated only from observed samples in the IFLS. Furthermore, when the analysis is based on past working status, the instrument is not adjusted for that year and still uses an existing variable in the survey year. This is because the working status in the past 12 months for the women who moved to another household in the same area is still recorded. This is beneficial since the number of productive-age women in the subdistrict is still preserved to build up the instrument with more samples. This case will not happen if the instrument is adjusted to the past working status due to the unavailability of the data for mover individuals in the same subdistrict that reduces the sample of women, thus influencing the construction of employment rate in the area. It might also decrease the sample size used in the analysis if there are no other productive-age women in the subdistrict to build the instrument.

Lastly, this study does not explore the effect of mothers working in the formal and informal sectors. An exploration of these variations could provide exciting results. On the one hand, the formal sector is protected by the maternity leave policy, which could be used to maintain maternal and infant health. However, new mothers must return to work with rigid working hours when the leave is over. On the other hand, while the informal sector is not covered with maternity leave, these mothers are more likely to have flexibility in working that could benefit them in caring for their child. Future studies might explore this variation using the available data to see whether the effect of working mothers differs by sector.

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Appendices

	(1) Working Mother	(2) Non-Working Mother	(1) – (2) Diff	P-value
HAZ score	-1.500	-1.456	-0.044	0.1738
Stunting [d]	0.373	0.366	0.007	0.4957
Child's age (months)	33.451	28.390	5.061	0.0000
Child's gender (= 1 if male) [d]	0.515	0.528	-0.013	0.1975
Birth order	2.226	2.016	0.210	0.0000
Low birth weight (<2.5 kg) [d]	0.071	0.061	0.010	0.0941
Premature birth (<37 weeks) [d]	0.715	0.731	-0.016	0.1083
Exclusive breastfeeding [d]	0.147	0.151	-0.004	0.6607
Twin births [d]	0.039	0.038	0.001	0.8188
Mother's age	31.195	29.139	2.056	0.0000
Mother's height	151.488	151.358	0.130	0.2507
Mother's years of schooling	9.326	8.853	0.473	0.0000
Prenatal visit (WHO standards) [d]	0.259	0.257	0.002	0.8749
Smoking father [d]	0.700	0.727	-0.027	0.0068
Num of children under 15	2.070	1.959	0.111	0.0000
Per capita expenditure (PCE)	643,113	560,661	-82,451	0.0000
Log PCE	12.987	12.865	0.122	0.0000
Clean drinking water [d]	0.910	0.915	-0.005	0.4241
Has own latrine [d]	0.628	0.635	-0.007	0.4598
Have servants [d]	0.018	0.006	0.013	0.0000
Has saving [d]	0.329	0.267	0.061	0.0000
Floor-type from ceramic/tiles/cement [d]	0.810	0.812	-0.002	0.8179
Wall type from masonry [d]	0.706	0.713	-0.007	0.4394
Num of other adult women in the HH	0.535	0.481	0.054	0.0076
Live in urban [d]	0.515	0.572	-0.057	0.0000
Num of posyandu	7.429	7.664	-0.235	0.0914
Num of small industry (sqrt)	17.574	16.608	0.967	0.0002
Cluster average of women working status	0.581	0.510	0.072	0.0000
Observations	4,384	4,827		

Note: Superscript [d] indicates a dummy variable.

Appendix 1. T-Test of Mean Differences Between Characteristics of Working and Non-Working Mothers in the Past 12 Months

Source: Author's calculation from IFLS 3, 4, & 5 and Podes 2000, 2008, & 2014.

	(1) Bottom 40%	(2) Upper 60%	(1) – (2) Diff	P-value
HAZ score	-1.685	-1.339	-0.347	0.0000
Stunting [d]	0.439	0.323	0.116	0.0000
Work this year [d]	0.436	0.502	-0.066	0.0000
Work while pregnant [d]	0.407	0.476	-0.070	0.0000
Work while child 0-1 year [d]	0.388	0.450	-0.062	0.0000
Work while child 1-2 years [d]	0.443	0.470	-0.027	0.0319
Work always for two years after birth [d]	0.428	0.460	-0.032	0.0154
Monthly present working hours	153.380	167.048	-13.668	0.0000
Working field (categorical)	4.026	5.602	-1.576	0.0000
Child's age (months)	30.144	31.235	-1.091	0.0038
Child's gender (= 1 if male) [d]	0.521	0.523	-0.002	0.8185
Birth order	2.371	1.946	0.424	0.0000
Low birth weight (<2.5 kg) [d]	0.067	0.065	0.002	0.7421
Premature birth (<37 weeks) [d]	0.716	0.729	-0.013	0.2147
Exclusive breastfeeding [d]	0.110	0.172	-0.062	0.0000
Twin births [d]	0.039	0.038	0.001	0.8765
Mother's age	29.820	30.316	-0.495	0.0001
Mother's height	150.602	151.965	-1.363	0.0000
Mother's years of schooling	7.394	10.201	-2.807	0.0000
Prenatal visit (WHO standards) [d]	0.208	0.286	-0.079	0.0000
Smoking father [d]	0.725	0.706	0.019	0.0622
Num of children under 15	2.211	1.879	0.332	0.0000
Clean drinking water [d]	0.881	0.934	-0.053	0.0000
Has own latrine [d]	0.457	0.748	-0.292	0.0000
Have servants [d]	0.006	0.015	-0.009	0.0001
Has saving [d]	0.202	0.360	-0.158	0.0000
Floor-type from ceramic/tiles/cement [d]	0.720	0.872	-0.152	0.0000
Wall type from masonry [d]	0.592	0.788	-0.196	0.0000
Num of other adult women in the HH	0.517	0.501	0.016	0.4372
Live in urban [d]	0.432	0.620	-0.188	0.0000
Num of posyandu	6.304	8.384	-2.080	0.0000
Num of small industry (sqrt)	17.565	16.736	0.829	0.0015
Cluster average of women working status	0.536	0.549	-0.013	0.0035
Observations	3,684	5,527		

Note: Superscript [d] indicates a dummy variable.

Appendix 2. T-Test of Mean Differences in Characteristics Across Economic Levels

Source: Author's calculation from IFLS 3, 4, & 5 and Podes 2000, 2008, & 2014.