

JURNAL EKONOMI KUANTITATIF TERAPAN

Affording Homes in Yogyakarta: An Empirical Analysis of Local Housing Market Affordability

Bagaskara, Yudistira Permana, Maygsi Suwandi

Monetary Policy in Action: The Dynamic Influence of Reserve Requirements on Bank Lending in Indonesia

Vadilla Mutia Zahara, Maitsoo Zalfaa, Togi Haidat Mangara

Public Expenditure and Human Development Convergence in Eastern Indonesia 2015-2023

Eva Setyaningsih, Yozi Aulia Rahman

The Impact Analysis of Green Bond Issuance on Carbon (CO₂) Emissions: Green Finance Transformation in Developed and Developing Countries

Wijianto, Telisa Aulia Falianty

Internet Utilization and Local Government Procurement for MSEs

Vianita Lianasari Dini, Riatu Mariatul Qibthiyyah

Analysis of The Relationship between Child Marriage and Women's Employment Sector

Priskila Saragih

The ASEAN Export Paradox: Endogenous Resilience and Structural Transformation in Southeast Asian Trade Dynamics

Endang, Hartiningsih Astuti, Diah Chitra Puspitaningrum

Cost And Benefit Analysis Pelaksanaan Program Desa Bersih Narkoba (Bersinar) Melalui Pendekatan Ketahanan Sosial

Ade Aryanti Fahrani, Palupi Lindiasari Samputra

Poverty Alleviation Model in Tasikmalaya City: An Analytic Network Process Approach

Apip Supriadi, Gusti Tia Andriani, Aso Sukarso, Jumri

The Effect of Exchange Rates on Exports in the Era of Global and Regional Value Chains

Rizke Dwi Setiyani, Sugiharso Safuan

Analysis of The Relationship between Child Marriage and Women's Employment Sector

ABSTRAK

Pernikahan anak masih menjadi suatu masalah yang dihadapi di Indonesia. Hal ini turut berkontribusi padanya lambatnya peningkatan Tingkat Partisipasi Angkatan Kerja (TPAK) perempuan. Pernikahan anak berimplikasi pada tingkat pendidikan yang rendah sehingga banyak perempuan yang mengalami putus sekolah. Padahal, dibutuhkan modal manusia yang berkualitas dan berdaya saing untuk bisa berpartisipasi pada sektor pekerjaan formal yang menyediakan upah, jaminan, dan perlindungan sosial bagi pekerjanya. Penelitian ini melengkapi penelitian sebelumnya dengan menggunakan data Survei Sosial Ekonomi Nasional (SUSENAS) 2023 dan mengakomodir aturan terbaru usia minimal pernikahan pada UU No. 16 Tahun 2019 menggunakan Linear Probability Model (LPM) serta menguji kestabilan arah koefisien pernikahan anak melalui oster test. Temuan menunjukkan bahwa pada jangka pendek, pernikahan tidak berpengaruh terhadap peluang perempuan bekerja di sektor formal (mengacu pada konsep sektor formal BPS). Salah satu alasan yang mungkin mendasari perbedaan ini adalah periode observasi yang pendek dan keterbatasan metodologi. Sehingga penelitian di masa mendatang perlu mempertimbangkan batasan dari studi ini.

Kata kunci: pernikahan anak, sektor formal, *linear probability model*, *oster test*

Klasifikasi JEL: J12, J13, J16, J21, J24

ABSTRACT

Child marriage is still a problem faced in Indonesia. This also contributed to the slow increase in the Female Labor Force Participation Rate (LFP). Child marriage has implications for low levels of education, so many women drop out of school. In fact, quality and competitive human capital is needed to be able to participate in the formal work sector that provides wages, guarantees, and social protection for its workers. This study complements previous research using data from the 2023 National Socio-Economic Survey (SUSENAS) and accommodates the latest rules on the minimum age of marriage in Law No. 16 of 2019 using the Linear Probability Model (LPM) and testing the stability of the direction of the child marriage coefficient through the oster test. The findings show that in the short term, marriage has no effect on women's chances of working in the formal sector (referring to the BPS formal sector concept). One of the possible reasons underlying this difference is the short observation period and methodological limitations. So future research needs to consider the limitations of this study.

Keywords: child marriage, formal sector, linear probability model, oster test

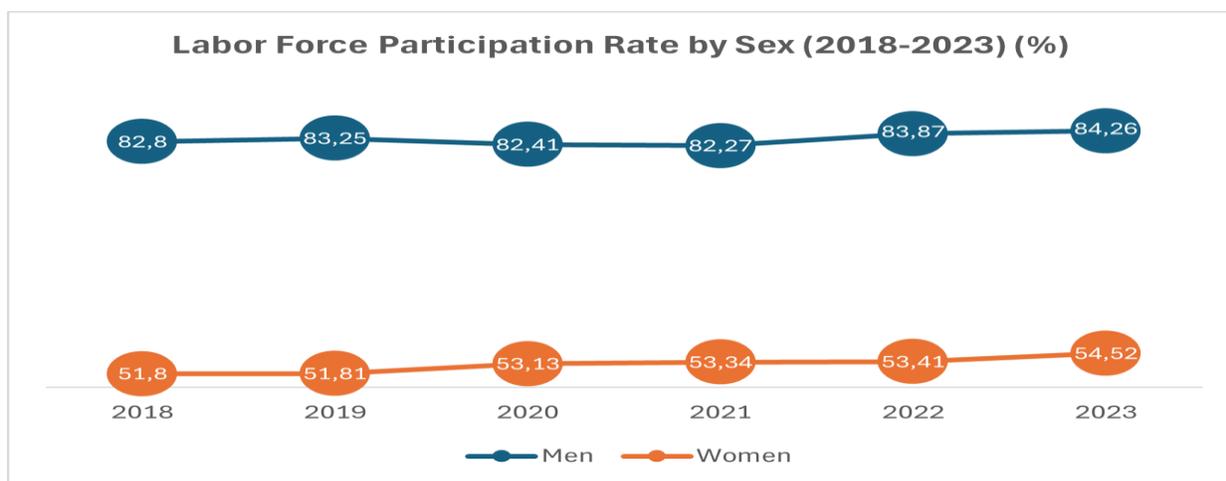
JEL Classification Codes: J12, J13, J16, J21, J24

INTRODUCTION

Indonesia has recorded stable economic growth and poverty alleviation in the past two decades that have helped reduce the gender gap. However, the labour force participation (LFP) gap between men and women remains large, being one of the largest in East Asia and the Pacific. Most women

still work in low-productivity sectors, especially the informal sector (World Bank, 2024). This gap is closely related to the high rate of child marriage, which negatively impacts women's economic participation. Countries with high rates of child marriage tend to have a slower increase in women's child marriage (World Bank, 2017).

Figure 1: Labour Force Participation by Gender (2018-2023)



Source: BPS

The phenomenon of child marriage in Indonesia, although decreasing (Figure 2.), is still high and concentrated in several areas that are 'pockets of child marriage incidents' (Irhamni and Sahadewo, 2023). Indonesia occupies the fourth position in the world for girl marriage. Women who

marry young lose access to education, face discrimination in the workplace, and are more vulnerable in the informal sector (Jordan and Zitek, 2012). As a result, women's labor participation has decreased significantly, peaking at the age of 45 (World Bank, 2024).

Figure 2: Prevalence of Child Marriage in Indonesia 2008-2018 (Percent)

Source: PUSKAPA

The consequences of child marriage are very multidimensional, which has an impact on health, education, and is vulnerable to discrimination in the world of work. This is because employers have a tendency to be biased towards female workers, especially those who are married. They consider that married women, especially married at a young age, have high domestic responsibilities.

Child marriage creates an opportunity cost that women must bear and this weakens their competitiveness in the labor market. This situation is exacerbated by employment policies that

are not fully responsive to women's social needs and roles. Child marriage also increases the risk of dropping out of school and encourages women to enter informal work (Azmi et al., 2023). Even though the majority of wage earners (PPU) are in the formal sector (Zulfiyandi et al., 2021). Women in the informal sector generally work without adequate social protection and low wages, especially in rural areas (World Bank, 2020).

When women are trapped in low-wage informal jobs, their potential contribution to economic growth becomes suboptimal. In fact, in the long

term they will have high economic dependence on their spouses, loss of financial independence, and the risk of intergenerational poverty.

Previous studies such as Cameron et al. (2023) have indeed examined the impact of child marriage on the employment sector using IFLS data. In the study, the factors that affect a person working in the formal sector include age, religion/belief, and area of residence (urban or rural). The results of the study stated that women who married at the age of children were twelve percent less likely to work in the formal sector than women who married in adulthood. The sample coverage in the study was male and female and was limited to women whose status was married, without considering the status of divorced women and the law regulating the minimum age of marriage. This study fills the gap by examining the same thing (whether child marriage decreases women's chances of working in the formal sector) using different and latest data sets (SUSENAS), and controlling marital status (marriage or divorce).

The study also aims to update the analysis by focusing on marriage after Law No. 16 of 2019 was passed, where the minimum age for women to marry increased from 16 years to 19 years. Increasing the age of marriage in accordance with the new law can provide greater opportunities for women to pursue high school/vocational education at the same level. In contrast to the previous law, namely Law No. 1 of 1974 where women can get married at the age of 16 (not yet graduated from high school/vocational school equivalent). So this research can be seen as a continuation of the research of Cameron et al. (2023) using the context of the new law. However, due to limited data, which caused the fixed effect method used by Cameron et al. (2023) to not be used, this study used the OLS (LPM) method which was tested for stability through the oster test. This study also conducted an additional analysis by examining the definition of formal sector jobs to see the robustness of the results.

Taking into account all of the above contexts, this study aims to analyze the relationship between child marriage and women's employment opportunities, especially to find out whether women who marry at a young age have a greater tendency to work in the informal sector. By understanding the relationship between the age of marriage and the women's employment sector, this study is expected to provide an overview of the importance of considering marriage conditions in women's employment policies. This analysis uses data from the National Socio-Economic Survey (SUSENAS) March 2023 and the Open Unemployment Rate (TPT) results of the National Labor Force Survey (SAKERNAS) in August 2022 published by the Central Statistics Agency. There are two sample scopes in this study for the comparison of the impact of child marriage. The first is women aged 10-27 years who are married in 2019 and above and have a working status. The second is women of productive age (15-64 years old) who are married in 2019 and above and have a working status. The

definition of age of children used in this study is those under the age of 19 (Law Number 16 of 2019).

Therefore, this study wants to answer: How does child marriage affect women's chances of working in the formal sector? In theory, child marriage inhibits women's productivity in the labor market through disruption of formal education (Field and Ambrus, 2008), increased domestic burden (Wang and Wang, 2017), and transmission of traditional norms (Asadullah and Wahhaj, 2019). The prevention of child marriage in Indonesia is currently not running optimally. In addition, given the limited study on the impact of child marriage on women's employment sectors, this research is expected to make an important contribution in designing employment policies that are more inclusive and responsive to the social realities of women in Indonesia.

RESEARCH METHODOLOGY

Research on child marriage and its relationship to the employment sectors of women and men was previously conducted by Cameron et al. (2023)

covering individuals aged 18 years and above and found that the chances of individuals who married in childhood to work in the formal sector were smaller than those of individuals who married in adulthood using the fixed effect on the data. The study did not distinguish the impact of child marriage on certain age groups. By treating adults as a homogeneous group, the analysis potentially obscures important life-cycle variations in how child marriage shapes labor market outcomes. The consequences of child marriage are unlikely to be uniform across age cohorts, as women in early productive ages, prime working ages, and older ages face different labor market opportunities, constraints, and recovery mechanisms. Moreover, while Cameron et al. (2023) examined the broader socio-economic impacts of child marriage across all adult individuals, their study did not specifically focus on how its effects may vary across particular age groups of women within specific employment sectors. So, it is suspected that there is a difference in the influence of child marriage on certain age groups.

The gap that this study seeks to fill is to use a new data set to look at the relationship between child marriage and the women's employment sector in the context of the new Child Marriage Law. This study also tried to look at the cohort-effect using a sample of women aged 10-27 years during the survey who were married in 2019 and above and working. Following Cameron et al. (2023), this study also regressed on a sample of women of productive age (15-64 years) who were married in 2019 and above and worked. In the first sample coverage, their chances of having young children at the time of the survey were much greater than in the second sample.

There is a tendency that women in Indonesia work in the informal sector (BPS, 2024). This pattern is not merely the result of labor market dynamics, but is closely intertwined with structural and life-course factors that shape women's economic opportunities from an early age—*one of the most critical being early marriage*. This is exacerbated when they experience marriage at a young age. Women who marry at a young age are not able to maximize their educational

attainment, which makes it an obstacle for them to participate in the labor market, especially in the formal sector that requires a certain level of education for its workers. The benefits of education investment are not optimal for women who marry at the age of children because before they reach the age of 19, there are various factors that encourage them to get married such as social pressure, culture, pregnancy out of wedlock, and so on. The consequence of child marriage, namely the faster domestic role carried out by women, also plays a role in influencing their chances of working in the formal sector.

Women who marry in childhood are also faced with a longer reproductive period than women who marry in adulthood. Thus, their chances of getting job obstacles from the presence of young children, parenting, and so on are greater and this further reduces their chances of working in the formal sector. The presence of young children can indeed be an obstacle for women to participate in the labor market (ILOSTAT, 2024). Thus, in this study, it is suspected that child marriage has a negative effect on

women's chances of working in the formal sector.

The formal sector has several characteristics, namely: fixed wages, fairly high education (there is a minimum educational requirement to register), formal employment relationships (workers have a clear employment contract or agreement with the company), usually in the modern sector (e.g. large manufacturing), registered employment, regulated by the government (payment of taxes, contributions, and social security), and the existence of social security ownership and guaranteed labor rights such as leave without salary deduction (Pratomo and Manning, 2022). Meanwhile, according to Rothenberg et al. (2016), the informal sector in Indonesia has the following characteristics: having low wages, low productivity (informal micro businesses on average only generate added value per worker around 4.5 percent of the average large formal company), low education (informal business owners/managers mostly only graduate from elementary school or less), local

markets are still limited (75 percent of informal businesses only sell their products in local districts/cities, very rarely exports), tends not to develop, and is not registered or officially licensed. In addition, the informal sector does not have social guarantees and protection for its workers (workers in this sector do not receive health insurance, pension, or employment protection (ILO, 2018), and have modest capital and technology (Chen, 2012).

There are three proxies used to define someone working in the formal sector or the informal sector (Pratomo and Manning, 2022). Proxy 1 is the most widely used, which uses the concept of BPS which refers to a person's employment status (this information is captured on the SUSENAS questionnaire). A person works in the formal sector if his employment status is sought by permanent workers/paid laborers and laborers/employees/employees. Meanwhile, other employment statuses are classified as informal sector workers. In the formal sector, the economic level

of workers is quite advanced/modern, the skills of the workforce are better, and the level of education of workers is quite high. However, in the informal sector, labor protection is weak and job protection is less secure. Proxy 2 refers to the concept of CPM as well by combining employment status and categories of workers (e.g., self-employed professionals, managers, and administrative workers, all of whom are considered formal workers according to proxy 2). Proxy 3 also takes into account the type of company, the type of bookkeeping of the workplace, and access to social security. In addition, in the research of Pérez (2020), formal workers are workers who get health insurance from their employers (offices).

When compared to the research of Cameron et al. (2023) the study does not explain specifically and in detail where the concept of the formal sector is used. Another study used data from the Indonesia Family Life Survey (IFLS) and reviewed the same thing. Meanwhile, the research of (Swarniati, 2024) examines opportunities to work in the formal

sector using IFLS using the same reference as BPS. Where the formal sector in IFLS is formed from the employment status data of each individual who works, namely working alone with permanent workers, government workers, and private workers/employees. Meanwhile, the informal work sector is self-employed, self-employed with unpaid family workers/temporary workers, freelance workers in agriculture and non-agriculture, and unpaid family workers. The IFLS questionnaire includes details of the status of the main job and additional jobs. If only one of them is in the formal sector, then the individual will be classified as working in the formal sector. However, the formal sector definition of this study may differ from the research conducted by Cameron et al. (2023).

This study uses cross-section data from the March 2023 National Socio-Economic Survey (SUSENAS) conducted by the Statistics Indonesia (BPS). In addition, data on the provincial Open Unemployment Rate (TPT) as of August

2022 from BPS is also used. There are two sample scopes used in this study. The first sample consisted of women aged 10-27 years. Job details at SUSENAS include individuals who are 10 years old and older and have employment status. Meanwhile, the minimum age for marriage regulated in Law No. 16 of 2019 is 19 years old. So that the age group in the first sample coverage is 10-27 years. Meanwhile, the second sample coverage is women of productive working age, namely at the age of 15-64 years. Women's chances of working in the formal sector are estimated by interest variables in the form of child marriage status and control variables in the form of women's age, marital status (married or divorced), length of schooling, status as Head of Household (KRT), breadwinner status (largest spender in household), proportion of working Household Members (ART), number of toddlers, area of residence/urban (urban or rural), and Open Unemployment Rate (TPT).

The analytical model used to further study the relationship between marriage and the formal-informal work sector is the Linear Probability Model (LPM) regression model which uses dummy-bound

variables with two formal (Y=1) and informal (Y=0) categories. The main purpose of using this model is to estimate the opportunities for women to work in the formal sector based on the status of child marriage with the following model:

$$formal_i = \alpha_0 + \alpha_1 M_i + \delta X_i + \epsilon_i \quad (1)$$

Where:

$formal_i$ = Dummy sector (1=formal, 0=informal)

M_i = Dummy child marriage status (1=Child Marriage, 0= Other)

δX_i = Vector of control variables

ϵ_i = error term

There is a potential for Omitted Variable Bias (OVB) where variables such as culture (affecting women's chances of marrying at a young age and affecting women's chances of working in the formal sector) are not present in SUSENAS data (these variables may also affect women's chances of working in the formal sector). LPM also has a limitation where the resulting coefficient can be worth more than one and this is contrary to the basic concept of opportunity (Cameron and KTrivedi, 2005)). So it is necessary to check robustness with the Probit and Logit models. LPM, Probit, and Logit also have

the potential for bias due to unobservable confounders (e.g., the culture and socio-economic of women's families in the past and others), so an oster test is needed to evaluate the stability of bias.

The probit regression model in this study is as follows:

$$\Pr(formal_i = 1|x) = \alpha_0 + \alpha_1 M_i + \delta X_i + \epsilon_i \quad (2)$$

The logistic regression model in this study is as follows:

$$\ln \left[\frac{\Pr(formal=1|x)}{\Pr(formal=0|x)} \right] = \alpha_0 + \alpha_1 M_i + \delta X_i + \epsilon_i \quad (3)$$

The oster test is carried out by comparing the estimated results without control variables and with control variables that are gradually inserted into the model. The Oster test not only compares child marriage coefficients as in traditional sensitivity tests, but also looks at R2 changes that offer a more comprehensive evaluation of the model's resilience. Some of the components of the oster test include: Rmax to show R2 on regression which includes observed and unobserved control variables and Delta used to measure the proportional impact of unobserved variables relative to observed variables. If

the absolute value of this delta is less than one, then the strength of the observed variable is greater than that of the unobserved variable. Conversely, if the absolute value of this delta is greater than one, then the strength of the observed variable is smaller than that of the unobserved variable (Oster, 2019).

Another robustness check was carried out by simulating the definition of the formal sector with a stricter concept carried out on the basis of the consideration that the employment status reference in the SUSENAS data may not be robust enough to categorize a woman as a formal worker or informal worker. It could be that due to categorization only based on job status, a woman who should be categorized as an informal worker, becomes a formal worker. In this robustness check, the results of LPM regression were compared in both datasets (10-27 years old sample and 15-64 year old sample) and also the results of the oster test on a stricter formal sector definition.

RESULT AND DISCUSSION

Table 1. presents descriptive statistics from 23,333 observations used in the analysis of women's employment opportunities in the formal sector. Based on the results of descriptive statistics, the number of workers in the formal sector and informal sectors based on the BPS concept is almost balanced with the proportion of formal sector workers, which is 49.87 percent. Meanwhile, with a stricter formal sector concept (BPS concept and the requirement for health insurance from the office), formal sector workers in this sample only cover 1.58 percent of the entire sample. This indicates that BPS needs to specify the definition of the formal sector to be able to capture how child marriage affects their chances of working in the formal sector more than just looking at their employment status. Furthermore, it is known that only 15.58 percent of this sample underwent child marriage.

Table 1: Descriptive Statistics of Individual Characteristics of Sample 1 (Age 10-27 years)

| Variable | Obs | Mean | Std. dev. | Min | Max |
|-------------------------|--------|---------|-----------|-----|-----|
| formal (BPS) | 23.333 | 0,4987 | 0,5000 | 0 | 1 |
| formal (New Definition) | 23.333 | 0,0158 | 0,1248 | 0 | 1 |
| Child Marriage | 23.333 | 0,1558 | 0,3627 | 0 | 1 |
| Women's Age | 23.333 | 23,6073 | 2,6057 | 13 | 27 |
| Marital Status | 23.333 | 0,9383 | 0,2406 | 0 | 1 |
| Years of School | 23.333 | 11,6486 | 3,9303 | 0 | 22 |
| Head of Household | 23.333 | 0,0099 | 0,0990 | 0 | 1 |
| Breadwinner | 23.333 | 0,0360 | 0,1863 | 0 | 1 |

Source: BPS (proceed)

Based on the criteria of the sample that were met, namely those who were married in 2019 and above and worked in this sample scope, the minimum age was 13 years and the greatest age was 27 years. Most of the women in this sample are still married. Meanwhile, on average,

the length of school taken is 11 years. When viewed from their status as the head of household and the largest breadwinner, most of the women in this sample are not heads of households and are not breadwinners.

Table 2: Descriptive Statistics of Household Characteristics of Sample 1 (Age 10-27 years)

| Variable | Obs | Mean | Std. dev. | Min | Max |
|-----------------------------------|--------|--------|-----------|-------|-----|
| Proportion of worker in household | 23.333 | 0,6480 | 0,1847 | 0,125 | 1 |
| Number of Toddlers | 23.333 | 0,8919 | 0,7425 | 0 | 5 |

Source: BPS (proceed)

Table 3: Descriptive Statistics of Characteristics of Region Sample 1 (Age 10-27 years)

| Variable | Obs | Mean | Std. dev. | Min | Max |
|-------------------|--------|--------|-----------|------|------|
| Urban | 23.333 | 0,3807 | 0,4856 | 0 | 1 |
| Unemployment Rate | 23.333 | 5,0431 | 1,4391 | 2,34 | 8,31 |

Source: BPS (proceed)

Table 2. shows the characteristics of a household where at least one-eighth of all household members participate. Meanwhile, the most are the conditions where all household members participate. Furthermore, in terms of the number of toddlers in this sample, there are households that do not have toddlers, and households with the most toddlers have five toddlers. In Table 3., when viewed in terms of residential area, there are 38.07 percent of women from this sample coverage who live in urban areas.

Table 4. presents descriptive statistics from 37,002 observations used in the analysis of women's employment opportunities in the formal sector. From the results of descriptive statistics, the

number of formal sector workers and informal sectors based on the BPS concept is almost balanced and dominated by formal sector workers, which is 57.38 percent. Meanwhile, with a stricter formal sector concept (BPS concept and the requirement for health insurance from the office), formal sector workers in this sample only cover 1.98 percent of the entire sample. This indicates that BPS needs to specify the definition of the formal sector to be able to capture how child marriage affects their chances of working in the formal sector. Furthermore, it is known that only 9.74 percent of this sample underwent child marriage.

Table 4: Descriptive Statistics of Individual Characteristics of Sample 2 (Age 15-64 years)

| Variable | Obs | Mean | Std. dev. | Min | Max |
|-------------------------|--------|---------|-----------|-----|-----|
| formal (BPS) | 37.002 | 0,5738 | 0,4945 | 0 | 1 |
| formal (New Definition) | 37.002 | 0,0198 | 0,1393 | 0 | 1 |
| Child Marriage | 37.002 | 0,0974 | 0,2965 | 0 | 1 |
| Women's Age | 37.002 | 26,4549 | 4,8843 | 15 | 53 |
| Marital Status | 37.002 | 0,9451 | 0,2277 | 0 | 1 |
| Years of School | 37.002 | 12,4579 | 4,1428 | 0 | 22 |
| Head of Household | 37.002 | 0,0128 | 0,1122 | 0 | 1 |
| Breadwinner | 37.002 | 0,0522 | 0,2225 | 0 | 1 |

Source: BPS (proceed)

Table 5. shows the characteristics of a household where at least one in nine people in the household participates in work. Meanwhile, the most are the conditions where all household members participate. Furthermore, in terms of the number of toddlers in this sample, there are

households that do not have toddlers, and households with the most toddlers have five toddlers. In Table 6., when viewed in terms of the area of residence, there are 42.52 percent of women from this sample coverage who live in urban areas.

Table 5: Descriptive Statistics of Household Characteristics of Sample 2 (Age 15-64 years)

| Variable | Obs | Mean | Std. dev. | Min | Max |
|-----------------------------------|--------|--------|-----------|--------|-----|
| Proportion of worker in household | 37.002 | 0,6444 | 0,1866 | 0,1111 | 1 |
| Number of Toddlers | 37.002 | 0,9072 | 0,7381 | 0 | 5 |

Source: BPS (proceed)

Table 6. Descriptive Statistics of Characteristics of Region Sample 2 (Age 15-64 years)

| Variable | Obs | Mean | Std. dev. | Min | Max |
|-------------------|--------|--------|-----------|------|------|
| Urban | 37.002 | 0,4252 | 0,4944 | 0 | 1 |
| Unemployment Rate | 37.002 | 5,0716 | 1,4386 | 2,34 | 8,31 |

Source: BPS (proceed)

The descriptive statistics that have been described at the beginning of this chapter show that using the BPS formal sector concept, the percentage of formal workers in the young age sample (10-27 years) is almost balanced with informal workers, which is 49.87 percent.

Meanwhile, in this study, a new concept regarding the formal sector was used using the concept of BPS plus the ownership of health insurance from the office. The results are very different. Using a new, stricter concept, it is known that only 1.58 percent of women in the

young age sample work in the formal sector. The same results are also reflected in the productive age group (15-64 years), where using the BPS formal sector concept, there are 57.38 percent of women of productive age who work in the formal sector. However, when using the new, stricter concept, only 1.98 percent of women work in the formal sector.

Based on the results of the LPM regression, it can be seen that the coefficient and significance of the influence of child marriage decreases quite a lot when the formal sector is defined more strictly. This means that in the context of child marriage, the concept of the BPS formal sector needs to be more detailed in its formal worker criteria so that there is no overestimation on the influence of child marriage. For the young age group, the LPM regression with both the formal concept of BPS and

the new formal concept states that child marriage has no effect on those who are young in the short term since their marriage. However, child marriage is more influential for the productive age group with a significance level of one percent.

The results of the R-square decreased significantly both at young age (from 21.07 percent to 1.09 percent) and productive age (from 22.10 percent to 1.20 percent) after the formal sector concept was tightened due to the small number of samples working in the formal sector using the new concept. It could be that if the concept of the formal sector of BPS is given more conditions, then in reality there are very few women formal workers in Indonesia. The results of the initial descriptive statistics stating that the number of formal and informal workers are almost balanced will turn into a much different percentage of formal and informal workers.

Table 7: Robustness Check LPM BPS Formal Concept and New Formal Concept

| | Sample 1 (10-27 years) | | Sample 2 (15-64 years) | |
|--|------------------------|------------------------|------------------------|------------------------|
| | BPS Formal Concept | New Formal Concept | BPS Formal Concept | New Formal Concept |
| Child Marriage (1 = Child Marriage) | 0,0120 (0,0107) | -0,0022 (0,0030) | -0,0803*** (0,0088) | -0,0073*** (0,0028) |
| Women's Age | 0,0266*** (0,0016) | 0,0013*** (0,0004) | 0,0070*** (0,0005) | 0,0002 (0,0002) |
| Marital Status (1 = Married) | -0,0767*** (0,0124) | 0,0057 (0,0035) | -0,0417*** (0,0103) | 0,0075** (0,0033) |
| Years of school | 0,0326*** (0,0008) | 0,0011*** (0,0002) | 0,0401*** (0,0006) | 0,0013*** (0,0002) |
| Head of Household (1 = Head of Household) | -0,0760** (0,0313) | -0,0054 (0,0088) | -0,0780*** (0,0220) | -0,0019 (0,0070) |
| Breadwinner (1 = Breadwinner) | 0,0876*** (0,0166) | 0,0012 (0,0046) | 0,0878*** (0,0111) | -0,0003 (0,0035) |
| Proportion of worker in household | -0,3596*** (0,0189) | 0,0003 (0,0053) | -0,3319*** (0,0146) | -0,0006 (0,0046) |
| Number of Toddlers | -0,1003*** (0,0047) | -0,0012 (0,0013) | -0,0704*** (0,0037) | 0,0010 (0,0012) |
| Urban (1 = Urban) | 0,1704*** (0,0063) | 0,0161*** (0,0018) | 0,1475*** (0,0048) | 0,0200*** (0,0015) |
| Unemployment Rate | 0,0151*** (0,0021) | 0,0023*** (0,0006) | 0,0076*** (0,0016) | 0,0036*** (0,0005) |
| Constant | -0,2595*** (0,0417) | -0,0493*** (0,0117) | 0,1090*** (0,0225) | -0,0351*** (0,0071) |
| r ² | 0,2107 | 0,0109 | 0,2210 | 0,0120 |
| F | 622,67 | 25,59 | 1.049,14 | 44,99 |
| N | 23.333 | 23.333 | 37.002 | 37.002 |

Source: BPS (proceed)

*p<0,1 **p<0,05 ***p<0,01

Another striking difference when using a stricter formal sector concept, many covariates that were originally significant with the formal concept of BPS become insignificant when using the new formal concept. Variables of individual characteristics (marital status,

KRT, breadwinner) and household characteristics (proportion of working ART and number of children under five) also contributed to changes in the significance of this model. However, the direction of this coefficient also needs to

be tested for sensitivity analysis with an oster test.

The results of the oster test of young age samples with a new formal concept produced a t value of 0.7666. This means that based on the results of the oster test, the same conclusion as the LPM regression is given. Child marriage in the short term has no effect on young women if the concept of the formal sector is used which is stricter than the concept of the formal sector of BPS.

The results of the oster test of the productive age sample with a new formal concept yielded a t of 1.5357. This means that supposedly at productive age, child marriage does not affect women's chances of working in the formal sector. Just like the young age sample that experienced child marriage, in the productive age sample there were also no women with KRT status or breadwinners working in the formal sector.

Based on the results of the oster test above, it can be concluded that in the short term, child marriage has no effect on the chances of women of young age

(10-27 years) and productive age (15-64 years) to work in the formal sector either by using the BPS formal sector concept or with a stricter formal sector concept.

If the regression results of this study are compared with previous studies by Cameron et al. (2023). With the note that there are some differences in the coverage of this sample with the previous study, namely that this study included those whose status is divorced, here are also two different datasets with two formal sector approaches. Previous studies have shown that child marriage lowers women's chances of working in the formal sector by a significant level of one percent. Different results were found between this study and the previous research due to the relatively short time period coverage in this study, namely from the enactment of the law regulating the minimum age for child marriage between 2019 and the survey year 2023.

Table 8: Oster Test of Sample 1 (10-27 years) by BPS' Concept of Formal Sector

| Variables are entered incrementally | Child Marriage | Women's Age | Marital Status | Years of School | Head of Household | Breadwinner | Proportion of worker in household | Number of Toddlers | Urban | Unemployment Rate |
|-------------------------------------|----------------|-------------|----------------|-----------------|-------------------|-------------|-----------------------------------|--------------------|---------|-------------------|
| | formal | formal | formal | formal | formal | formal | formal | formal | formal | formal |
| child_marriage | - | - | - | - | - | - | - | 0,0015 | 0,0090 | 0,0120 |
| r2 | 0,2645*** | 0,0284** | 0,0334*** | 0,0184* | 0,0184* | 0,0197* | 0,0299*** | 0,0109 | 0,0109 | 0,0107 |
| Treatment_effect_delta | | 0,0416 | 0,0370 | 0,0558 | 0,0559 | 0,0545 | 0,0437 | 0,0814 | 0,0911 | 0,0948 |
| OVtest | | 0,2172 | 0,2563 | 0,1389 | 0,1389 | 0,1487 | 0,2279 | -0,0103 | -0,0621 | -0,0823 |
| t | | 3,6491 | 3,2456 | 5,1193 | 5,1284 | 5 | 4,0092 | 7,4679 | 8,5140 | 8,8598 |

Source: BPS (proceed)

*p<0,1 **p<0,05 ***p<0,01

Table 9: Oster Test of Sample 2 (15-64 years) by BPS' Concept of Formal Sector

| Variables entered incrementally | Child Marr iage | Wom en's Age | Mari tal Statu s | Year s of Scho ol | Head of Hous ehold | Bread winner | Propo rtion of work er in house hold | Num ber of Todd lers | Urba n | Unempl oyment Rate |
|---------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|------------------------------------|------------------------------------|-----------------------------------|
| | form al | form al | form al | form al | forma l | formal | form al | form al | form al | formal |
| child_ma rriage | - 0,328 1*** (0,00 85) | - 0,211 9*** (0,00 94) | - 0,214 4*** (0,00 95) | - 0,104 6*** (0,00 89) | - 0,1046 *** (0,008 9) | - 0,1058* ** (0,0089) | - 0,111 8*** (0,008 9) | - 0,095 3*** (0,00 89) | - 0,082 2*** (0,00 88) | - 0,0803*** (0,0088) |
| r2 | 0,038 7 | 0,057 5 | 0,057 8 | 0,181 1 | 0,1811 | 0,1839 | 0,189 2 | 0,198 6 | 0,220 5 | 0,2210 |
| Treatmen t_effect | | - 0,156 2 | - 0,159 2 | - 0,050 1 | - 0,0501 | -0,0516 | - 0,058 6 | - 0,038 9 | - 0,023 7 | -0,0214 |
| delta | | 1,565 0 | 1,570 7 | 1,007 8 | 1,0078 | 1,0225 | 1,091 9 | 0,896 3 | 0,754 9 | 0,7335 |
| OVtest | | 0,000 0 | 0,000 0 | 0,000 0 | 0,0000 | 0,0000 | 0,000 0 | 0,000 0 | 0,000 0 | 0,0000 |
| t | | - 16,61 70 | - 16,75 79 | - 5,629 2 | - 5,6292 | -5,7978 | - 6,584 3 | - 4,370 8 | - 2,693 2 | -2,4318 |

Source: BPS (proceed)

*p<0,1 **p<0,05 ***p<0,01

Table 10: Oster Test of Sample 1 (10-27 years) by New Concept of Formal Sector

| Variables | Child Marriage entered increment ally | Wom en's Age | Mar ital Stat us | Year s of Sch ool | Head of House hold | Breadw inner | Propo rtion of worke r in house hold | Num ber of Todd lers | Urb an | Unemplo yment Rate |
|------------------|---|--------------------------|---------------------------|----------------------------|-----------------------------|----------------------|--|----------------------------------|----------------------|-----------------------------|
| | form al1 | form al1 | for mal 1 | for mal 1 | formal1 1 | formal1 | forma l1 | form al1 | for mal 1 | formal1 |
| child_marriage | -0,016 1*** (0,0022) | -0,004 9* (0,0030) | -0,000 47 (0,0030) | -0,000 41 (0,0030) | -0,00041 (0,0030) | -0,00041 (0,0030) | -0,00040 (0,0030) | -0,00034 (0,0030) | -0,00027 (0,0030) | -0,00022 (0,0030) |
| r2 | 0,0022 | 0,0037 | 0,0037 | 0,0057 | 0,0057 | 0,0057 | 0,0057 | 0,0058 | 0,0102 | 0,0109 |
| Treatment_effect | | -0,0006 | -0,0004 | 0,0001 | 0,0001 | 0,0001 | 0,0002 | 0,0009 | 0,0017 | 0,0023 |
| delta | | 0,6226 | 0,5911 | 0,5327 | 0,5320 | 0,5359 | 0,5225 | 0,4342 | 0,3408 | 0,2795 |
| OVtest | | 0,0003 | 0,0001 | 0,0129 | 0,0081 | 0,0019 | 0,0020 | 0,0018 | 0,0000 | 0,0000 |
| t | | -0,2 | -0,1333 | 0,0333 | 0,0333 | 0,0333 | 0,0667 | 0,3 | 0,5667 | 0,7667 |

Source: BPS (proceed)

*p<0,1 **p<0,05 ***p<0,01

Table 11: Oster Test of Sample 2 (15-64 years) by New Concept of Formal Sector

| Variables entered incrementally | Child Marr iage | Wom en's Age | Mari tal Statu s | Year s of Scho ol | Head of Hous ehold | Bread winner | Propo rtion of work er in house hold | Num ber of Todd lers | Urba n | Unempl oyment Rate |
|---------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|------------------------------------|------------------------------------|-----------------------------------|
| | form al1 | form al1 | form al1 | form al1 | forma l1 | formal 1 | form al1 | form al1 | form al1 | formal1 |
| child_ma rriage | - 0,019 5*** (0,00 24) | - 0,014 8*** (0,00 27) | - 0,014 3*** (0,00 27) | - 0,009 9*** (0,00 28) | - 0,0099 *** (0,002 8) | - 0,0099* ** (0,0028) | - 0,010 0*** (0,002 8) | - 0,010 0*** (0,00 28) | - 0,008 1*** (0,00 28) | - 0,0073*** (0,0028) |
| r2 | 0,001 7 | 0,002 1 | 0,002 2 | 0,004 8 | 0,0048 | 0,0048 | 0,004 9 | 0,004 9 | 0,010 7 | 0,0120 |
| Treatmen t_effect | | - 0,010 9 | - 0,010 8 | - 0,007 0 | - 0,0070 | -0,0071 | - 0,007 2 | - 0,007 2 | - 0,005 3 | -0,0043 |
| delta | | 1,403 7 | 1,492 1 | 1,604 2 | 1,6046 | 1,6086 | 1,633 0 | 1,617 5 | 1,416 3 | 1,2325 |
| OVtest | | 0,000 0 | 0,000 0 | 0,019 1 | 0,0162 | 0,0081 | 0,005 7 | 0,005 6 | 0,000 0 | 0,0000 |
| t | | - 4,037 0 | -4 | -2,5 | -2,5 | -2,5357 | - 2,571 4 | - 2,571 4 | - 1,892 9 | -1,5357 |

Source: BPS (proceed)

*p<0,1 **p<0,05 ***p<0,01

CONCLUSION

When the definition of the formal sector uses the concept of BPS, the proportion of formal and informal sector workers is almost balanced. However, after the concept of the formal sector was tightened, only about one percent of each sample became workers in the formal sector. Furthermore, this study shows that in the short term with reference to the BPS formal sector concept, child marriage reduces women's chances to work in the formal sector. The same is shown by the young age group (10-27 years old) which refers to a stricter formal concept. On the other hand, in the short term with a stricter formal sector reference, child marriage to women of productive age (15-64 years) has no effect on women's opportunities to work in the formal sector.

The comparison of the model with the BPS formal sector concept and the stricter formal sector concept provides the same implications for child marriage for the context of this (short-term) study. Whether it is by using the BPS formal sector concept or the new, more

restrictive formal sector concept, in the short term, child marriage has no effect on women's chances of working in the formal sector in both samples.

In the research of Cameron et al. (2023), the applicable law is Law No. 1 of 1974 where women aged 16 years and older are allowed to marry, although the study makes a benchmark for child marriage if it is carried out at the age of under 18 years and does not refer to Law No. 1 of 1974. Meanwhile, this study refers to Law No. 16 of 2019 where women aged 19 years and above are allowed to marry. This implies that women who were married in children before 2019 have a greater chance of dropping out of school than women who were married in 2019 and above. With the new law, women are encouraged to graduate from high school/vocational school first and then they can get married. This study shows different results from Cameron et al. (2023). One of the possible reasons underlying this difference is the short observation period and methodological limitations. So future research needs to consider the limitations of this study.

In the context of this study, BPS needs to further detail the details of the questions in the SUSENAS questionnaire related to job status and job categories as well as the ownership of health insurance from the office and add requirements for a person to be classified as a formal sector worker. This is because the definition of someone working in the formal sector only based on job status is felt to be less reflective of the actual situation in the field. After delving deeper into the ownership of health insurance from the office, the proportion of formal sector workers decreased drastically. This can be an evaluation for BPS to define the formal sector more strictly.

Meanwhile, the following policies are considered important to encourage women to be more empowered and able to work in the formal sector with good job quality. First, the government needs to develop scholarship programs and incentives should be focused on girls in vulnerable areas to ensure they are able to complete secondary and tertiary education as capital to get jobs in the formal sector with good quality. Second,

the government needs to provide skills training relevant to market needs in the formal sector, including digital literacy and finance, should be expanded to enhance women's competitiveness. Third, in terms of education, the government needs to ensure that the curriculum is relevant and of quality to ensure that women enter the formal sector labor market better. Fourth, the government needs to invest in affordable and quality childcare service infrastructure, both in the workplace and in the community, to reduce the double burden on women (especially those who still have toddlers). Fifth, the government also needs to enforce fair and flexible parental leave policies in the formal sector to allow women to balance family and career responsibilities without having to leave the workforce. Sixth, governments and policymakers must be more serious in supervising the quality of work, expanding social security for vulnerable workers, and encouraging the creation of decent and sustainable jobs. Finally, the program run by the Ministry of Women's Empowerment and Child Protection

(KemenPPPA) is in the form of providing access to capital for women through financial institutions, and the preparation of an active capital system for women micro business actors.

The limitations of this study include: This study does not include variables such as culture (affecting the chances of women marrying at a young age and affecting the chances of women working in the formal sector), work experience, job training and others to determine the opportunities for women to work in the formal sector due to limited data, not being able to see the specifics of the location or legal entity where women work, has not fully addressed the problem of OVB due to limited data and data forms (cross section), and the time benchmark for determining whether women marry in children or adults is still quite short, with the time the survey was conducted. In the future, perhaps about 20-30 years later, similar research is needed to see how the long-term impact of child marriage will be (noting that there has been no change in the minimum age of

marriage rules for women in Indonesia after Law No. 16 of 2019 was issued).

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APPENDIX

| | Sample 1 (10-27 years) | | Sample 2 (15-64 years) | |
|--|------------------------|------------------------|------------------------|------------------------|
| | Probit | Logit | Probit | Logit |
| Child Marriage (1 = Child Marriage) | 0,0110 (0,0108) | 0,0112 (0,0108) | -0,0696*** (0,0088) | -0,0652*** (0,0088) |
| Women's Age | 0,0248*** (0,0015) | 0,0247*** (0,0015) | 0,0068*** (0,0005) | 0,0067*** (0,0005) |
| Marital Status (1 = Married) | -0,0735*** (0,0121) | -0,0754*** (0,0123) | -0,0413*** (0,0101) | -0,0407*** (0,0102) |
| Lama Sekolah | 0,0332*** (0,0008) | 0,0336*** (0,0008) | 0,0388*** (0,0005) | 0,0392*** (0,0005) |
| Head of Household (1 = Head of Household) | -0,0799** (0,0311) | -0,0761** (0,0311) | -0,0863*** (0,0222) | -0,0859*** (0,0224) |
| Breadwinner (1 = Breadwinner) | 0,0905*** (0,0171) | 0,0954*** (0,0175) | 0,0948*** (0,0118) | 0,1024*** (0,0123) |
| Proportion of worker in household | -0,3744*** (0,0188) | -0,3791*** (0,0188) | -0,3406*** (0,0146) | -0,3451*** (0,0147) |
| Number of Toddlers | -0,1056*** (0,0049) | -0,1072*** (0,0049) | -0,0724*** (0,0037) | -0,0738*** (0,0038) |
| Urban (1 = Urban) | 0,1591*** (0,0059) | 0,1585*** (0,0058) | 0,1389*** (0,0046) | 0,1393*** (0,0045) |
| Unemployment Rate | 0,0161*** (0,0021) | 0,0163*** (0,0021) | 0,0088*** (0,0016) | 0,0087*** (0,0016) |
| Pseudo r2 | 0,1699 | 0,1706 | 0,1784 | 0,1797 |
| LR chi2 | 5.497,19 | 5.519,46 | 9.005,82 | 9.070,93 |
| log likelihood | -13.424,531 | -13.413,393 | -20.740,015 | -20.707,458 |
| N | 23.333 | 23.333 | 37.002 | 37.002 |