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Article

Impact Of Electronic Signature Implementation on The Number of Birth Certificates

Haryo Laksono[1] and Yohanna Magdalena Lydia Gultom[2]

Corresponding author. Email: haryo.laksono@ui.ac.id

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Abstract

This study compares the impact of the policy on implementing electronic signatures in the issuance of birth certificates in regencies/cities with low and high means years of schooling parents. Using Indonesian Susenas data from 2010-2021 and DID methods, this study finds that implementing electronic signatures could increase the number of birth certificates of 291 documents. However, by comparing the increase in the number of birth certificates subject to the number of birth certificates and the number of births, this study found that the impact of implementing electronic signatures was relatively low, around 7,02% and 3,73% in increasing the coverage of birth certificate ownership. This study also found economic benefits where each 1 rupiah of costs incurred generates 1,029 rupiahs in benefits. Electronic signatures can solve the difficulty of accessing civil registration services before implementation in regencies/cities with a low mean year of schooling parents but have a relatively low effect on increasing the coverage of birth certificate ownership.

Keywords: Electronic Signature; Mean Years of Schooling; Public Services.

[1] Department of Economics, Faculty of Economics and Business, Universitas Indonesia, Jakarta; School of Economics and Public Policy. E-mail: haryo.laksono@ui.ac.id
[2] Department of Economics, Faculty of Economics and Business, Universitas Indonesia, Jakarta; School of Economics and Public Policy. E-mail: yohanna.magdalena@ui.ac.id

1. Introduction

Civil registration is an essential public good that benefits individuals and societies (Setel et al., 2007). The birth certificate is a civil registration document and the initial prerequisite for citizenship status (Dow,1998). The birth certificate is proof of that legal identity and the basis upon which children can establish a nationality, avoid the risk of statelessness and seek protection from violence and exploitation (UNICEF, 2019). Birth certificates are essential for making public policies and policies in the medical sector (Brumberg et al. 2012). However, many low- and middle-income nations continue to face difficulties and inequalities in gaining access to birth certificates (Bhatia et al.,2017). In Indonesia, around 6% of children aged 0 to 17 years do not have birth certificates (Ministry of Women Empowerment and Child Protection, 2017). The birth registration system in Indonesia is incomplete because many births are registered several years after delivery. Consequently, birth registration based on parents' memories is often inaccurate, resulting in erroneous census data (Hull, 2007). Indonesian civil registration system has at least two obstacles: individuals who do not feel motivated or cannot apply for legal identity documents and local governments who do not actively reach out to the community to increase the scope of ownership (Sumner, 2014). One of the problems with registering birth certificates is the distance from civil registration services (Corbacho & Osorio, 2011). Besides that, the existence of costs makes it difficult for the community to access civil registration services. Apart from that, parents' understanding, reflected in the mean year of schooling parents', is also an essential enabler to increase birth certificate registration (Amo-Adjei & Annim, 2015). The lack of automatization in the civil registration system also takes time and complicates the service.

This study focuses on the effect of automatization in the civil registry on citizens' access to birth certificates. Several studies discuss the impact of the electronic signature implementation on the civil registration document. After electronic signature implementation, there was effectiveness in issuing family cards, evidenced by an increase in the number of family cards issued by the Solok City Disdukcapil in 2019-2020 compared to 2018-2018 (Rizqiqa & Amalia 2021). In addition, the implementation of electronic signatures in civil registration document services in Wonogiri Regency has increased the percentage ownership of family cards after electronic signature implementation (Septiana, 2021). Others, Luigi Lepato (2003) measured the impact of electronic signature on turnaround time for medical reports, where the application of electronic signature to radiology reports increased the proportion of completions and reduced processing time, decreasing from 11 days to 3 days with the introduction of electronic signatures. Several literature studies on electronic signature implementation research have used only descriptive qualitative methods. No further research has examined the impact of electronic signature implementation using quantitative data and econometric methods.

2. Method

This research uses the *difference-in-difference* (DID) method to see the impact of electronic signature implementation on the number of birth certificates. The effectiveness of the policy can be seen simply by comparing different regions related to the control group and the treatment group in the period before and after the treatment is carried out (Angrist & Pischke, 2014; Wing, Simon, and Gomez, 2018). Based on this explanation, the DID

approach is the most suitable method for seeing the results of parallel trends between the treatment group and the control group (Gultom, 2019; Miyawaki et al., 2017; Bertrand et al., 2004; Sun and Yan, 2019).

However, there are challenges faced in this study, which was the implementation of electronic signature carried out simultaneously in Indonesia in 2019, so that no regencies/city could enter into the control group. Therefore, this study follows Lucas and Mbiti (2015), which measures the variation in the effect of electronic signature implementation on the number of birth certificates by assuming the treatment group is the region that is supposed to have a more significant impact from electronic signature implementation, while the control group is a region that has a more negligible effect of electronic signature implementation.

In this study, the assumption is that the regencies/cities that will get a more significant impact from the implementation of electronic signature are regencies/cities with low mean years of parents' schooling; which become the treatment group, and regencies/cities with high mean years of parents' schooling become the control group. The assumption in determining the treatment group in this study is that there is a positive and significant correlation between the average length of high school and the formal sector labor market (Wasista, 2020). So, by working in the formal sector, parents will benefit from having a birth certificate such as salary allowances, health benefits, and others. With a high mean year of schooling, parents also understand the importance of birth certificates (Amo-Adjei & Annim 2015). Apart from that, by working in the formal sector, parents can relatively overcome the problem of access to civil registration services. In contrast, in regencies/cities with a low mean year of parents' schooling, with the assumption that many parents work in the informal sector, there are difficulties in overcoming the problem of access to civil registration services in terms of time and cost. Therefore, implementing electronic signatures is expected to eliminate issues related to access to civil registration services.

Table 1. Statistics Low Mean Year Schooling

Variable	N	Mean	Min	Max
Percentile 10	624	5.14	0.85	6.45
Percentile 20	612	6.73	6.46	6.96
Percentile 30	636	6.7	6.97	7.36
Percentile 40	600	7.53	7.38	7.67
Percentile 50	648	7.81	7.68	7.95
Percentile 60	588	8.12	7.96	8.29
Percentile 70	612	8.50	8.3	8.69
Percentile 80	624	9.00	8.7	9.49
Percentile 90	612	9.94	9.51	10.4
Percentile 100	612	11.06	10.46	12.6

Source: Susenas 2010 s.d 2021, processed

All data in this study comes from secondary data compiled in the form of panels based on regencies/cities in Indonesia and sourced from B.P.S. National Social and Economic Survey (Susenas) data from 2010 to 2021. To estimate the causality between the implementation of electronic signature and the number of birth certificates, we use DID model equation(1) ;

$$Y_{it} = \beta_0 + \beta_1 TTE_{it} + \beta_2 Regency_{it} + \beta_3 TTE_{it} \times Regency_{it} + X_{it} + \gamma_i + \delta_{rt} + \varepsilon_{it} \quad (1)$$

Where $\mathbf{Y_{it}}$ is the number of birth certificates owned by residents aged 0 to 1 year for district/city i in period t. $\mathbf{TTE_{it}}$ is the dummy implementation time of electronic signature for urban districts i in period t, with 1 representing the year of implementation in 2019 and the year after and 0 representing the year before implementation, namely 2010 to 2018. $\mathbf{Regency_{it}}$ is a dummy regency/city i in period t, with a low mean year of schooling parents below the 40th percentile. This variable aims to classify regencies/cities in binary into treatment and control group categories. Data a mean year of schooling parents were taken from data a mean year length of schooling in 2018, one year prior to electronic signature implementation. $\mathbf{TTE_{it} \times Regency_{it}}$ is an interaction between the dummy implementation time of electronic signature and dummy regency/cities where the coefficient $\beta 3$ shows the treatment effect. $\mathbf{X_{it}}$ are control variables such as headcount index (P0), total population, internet access, and birth number. It also includes regency fixed effects ($\boldsymbol{\gamma_i}$) and island-year interaction fixed effects ($\boldsymbol{\delta_{rt}}$).

However, in the DID method, it is necessary to prove a *common pre-treatment trend assumption* to prove a similar trend in the number of birth certificates in the treatment group and control group before the electronic signature implementation policy. So with the similarity of the trend before the electronic signature implementation policy, the difference in the movement of the number of birth certificates in the treatment group and control group after the electronic signature implementation policy can be claimed as an effect of the electronic signature implementation policy and did not cause by other policies.

The model used to test the common pre-treatment trend follows the equation model in Li, Hurley, Decicca, & Buckley (2014), Muralidharan & Prakash (2013), and Gultom (2019) with the regression equation(2) model as follows;

$$Y_{it} = \beta_0 + \beta_1 timerescale + \beta_2 timerescale \times Regency_{it} + \gamma i + \delta t + \varepsilon_{it} \quad (2)$$

Where $\mathbf{Y_{it}}$ is the number of birth certificates owned by residents aged 0 to 1 year for district/city i in period t. **Timerescale** is the variable time rescale dummy on each region, where 0 is for the first year of the policy implementation; -1, -2, -3 are for years prior to the policy implementation on each region; and 1, 2, 3 are for the years after

3. Results, Analysis, and Discussions

The DID method requires a common pre-treatment test to see the similarity of the trend (parallel trend assumption) in the number of birth certificates in the treatment group and control group prior to the electronic signature implementation policy. The test was carried out on several treatment group combinations: municipal districts with an average length of schooling below the 10th to the 80th percentile. Using DID regression as in equation 2, table 2 shows that the coefficient $\beta 2$; the interaction between the timerescale x

regencies/city, is statistically indistinguishable from zero (not significant at the 10% level) with coefficients 36.67, 10.43, 34.47, 1.118, 2.426, -7.890, 2.292, -9.123. These results show a similar trend in the number of birth certificates treatment group and control group before the implementation of electronic signature.

Table 2. Common Pre-Treatment Test

DEPENDENT VARIABLES Number of birth certificates	Regency with a low mean year of schooling parents'							
	10 % lowest (1)	**20 % lowest** (2)	**30 % lowest** (3)	**40 % lowest** (4)	**50 % lowest** (5)	**60 % lowest** (6)	**70 % lowest** (7)	**80 % lowest** (8)
Timerescale	146.5***	148.2***	140.0***	149.7***	149.0***	154.9***	148.6***	157.4***
	(15.74)	(16.38)	(16.45)	(16.57)	(18.20)	(21.22)	(25.52)	(33.81)
Timerescale x Regency	36.67	10.43	34.47	1.118	2.426	-7.890	2.292	-9.123
	(39.16)	(32.47)	(27.52)	(26.15)	(24.27)	(24.55)	(27.28)	(34.87)
Constant	5,071***	5,072***	5,071***	5,072***	5,072***	5,072***	5,072***	5,072***
	(79.91)	(79.98)	(79.72)	(79.94)	(79.96)	(79.99)	(79.99)	(80.01)
Observations	4,518	4,518	4,518	4,518	4,518	4,518	4,518	4,518
Number of Kode	514	514	514	514	514	514	514	514
R-squared	0.052	0.052	0.053	0.052	0.052	0.052	0.052	0.052

Note: Cluster standard errors by Regency/ City in parentheses
Signifikan level: *** p<0.01, ** p<0.05, * p<0.1

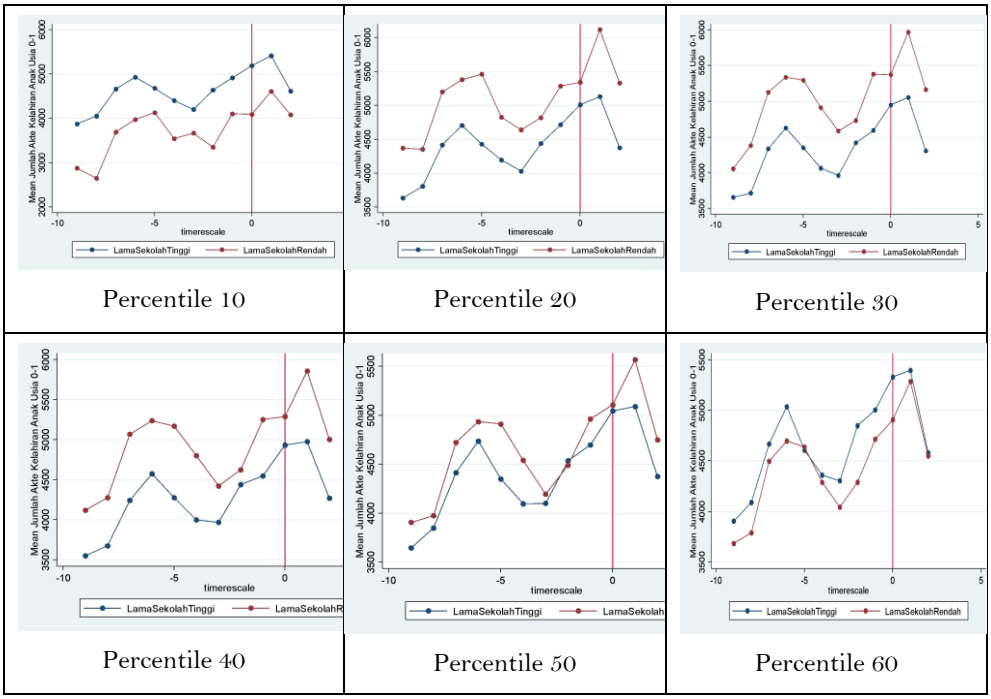

Figure 1. Parallel Trend Assumption Graphic

Therefore, the difference in trends in the treatment group and control group after the implementation of electronic signature is an effect of the electronic signature implementation in regencies/cities with a low mean year of schooling parents. Based on the results of the pre-treatment test, which showed a similar trend before the implementation of electronic signature between the treatment group and the control group, the study of the impact of electronic signature implementation on the number of birth certificates could be further analyzed.

It uses DID regression as in equation 1. Table 3 shows that the $\beta 3$ coefficient value of the interaction variable TTE x Regency with a low mean year of schooling parents is positive at 78.81 in column (1), 73.18 in column (2), 49.08 in column (3), 53.60 in column (4), it is 291.1 in column (5) and the significant level is at the 1% level in columns 5. Table 3 shows the regency with a low mean year of schooling parents below the 40th percentile. Meanwhile, a robustness check was carried out to provide confidence and see the consistency of the results of this study. In this robustness check, testing was carried out with various treatment group models, regency/city with a low mean year of schooling parents from below the 10th to below the 60th percentile. The robustness check shown in table 4 shows that the value of the coefficient $\beta 3$ of the interaction dummy variable TTE x Regency with a low mean year of schooling parents in various treatment group models is always consistently positive and significant at the 5% level.

Table 3. Effects of Electronic Signature Implementation on the Number of Birth Certificates

VARIABLES Number of birth certificates	(1)	(2)	(3)	(4)	(5)
TTE	-191.2**	-208.7**	-353.8***	-373.0***	-94.40
	(88.10)	(97.48)	(107.2)	(119.6)	(107.0)
TTE x Regency	78.81	73.18	49.08	53.60	291.1***
	(146.9)	(143.9)	(139.9)	(144.0)	(111.9)
Headcount Index (P0)		-1,783	-2,790	-2,750	-5,276**
		(2,683)	(2,502)	(2,503)	(2,286)
Total Population			5.206***	5.194***	0.288
			(1.852)	(1.866)	(1.491)
Internet Access				145.1	498.1
				(507.0)	(390.1)
Number Of Birth					0.470***
					(0.0305)
Constant	4,344***	4,590***	2,120**	2,056**	593.6
	(82.70)	(376.7)	(1,002)	(944.4)	(921.8)
Observations	6,057	6,057	6,057	6,057	6,057
R-squared	0.101	0.101	0.119	0.119	0.457
Number of Kode	514	514	514	514	514

Note:
Cluster standard errors based on Kabupaten/Kota in parentheses
Signifikan level: *** p<0.01, ** p<0.05, * p<0.1
All models control for Kabupaten Kota fixed effects dan Island-year interaction fixed effects

Table 4. Robustness Check

VARIABLES	Model Treatment Group							
Number of birth certificates	Percentile 10 (1)	Percentile 20 (2)	Percentile 30 (3)	Percentile 40 (4)	Percentile 50 (5)	Percentile 60 (6)	Percentile 70 (7)	Percentile 80 (8)
TTE	-110.3	-191.9*	-134.6	-94.40	-88.73	-59.20	786.1**	837.3***
	(120.1)	(114.9)	(111.3)	(107.0)	(108.4)	(109.9)	(306.1)	(315.2)
TTE x Regency	327.7*	483.4***	367.5**	291.1**	271.2**	203.3*	229.8**	173.0
	(179.8)	(155.0)	(130.8)	(111.9)	(100.6)	(100.5)	(108.6)	(129.5)
Headcount Index (P0)	-5,490**	- 5,122**	- 5,183**	- 5,276**	- 5,304**	- 5,478**	- 5,366**	- 5,368**
	(2,356)	(2,342)	(2,283)	(2,286)	(2,309)	(2,322)	(2,309)	(2,318)
Total Population	0.316	0.273	0.273	0.288	0.291	0.321	0.328	0.337
	(1.486)	(1.491)	(1.493)	(1.491)	(1.480)	(1.480)	(1.480)	(1.483)
Internet Access	543.8	687.6*	590.4	498.1	457.1	383.6	370.9	309.0
	(405.6)	(396.3)	(392.8)	(390.1)	(389.1)	(383.8)	(380.5)	(371.4)
Number Of Birth	0.469***	0.470***	0.470***	0.470***	0.470***	0.470***	0.470***	0.469***
	(0.0306)	(0.0304)	(0.0304)	(0.0305)	(0.0305)	(0.0306)	(0.0306)	(0.0308)
Constant	667.5	557.3	566.2	593.6	603.0	646.1	6.815	20.51
	(929.6)	(926.7)	(921.0)	(921.8)	(921.0)	(925.4)	(920.8)	(937.8)
Observations	6,057	6,057	6,057	6,057	6,057	6,057	6,057	6,057
R-squared	0.456	0.457	0.457	0.457	0.457	0.456	0.456	0.456
Number of Kode	514	514	514	514	514	514	514	514

Note:
Cluster standard errors based on Kabupaten/Kota in parentheses
Signifikan level: *** p<0.01, ** p<0.05, * p<0.1
All models control for Kabupaten Kota fixed effects and Island-year interaction fixed effects

This study shows that the impact of implementing electronic signature consistently increases the number of birth certificates in Regency with a low mean year of schooling parents below the 10th percentile to below the 80th percentile. These findings show that implementing electronic signatures in regencies/cities with a low mean year of schooling parents has positively impacted the number of birth certificates compared to urban districts with a high mean year of schooling.

These findings support previous studies where one of the obstacles encountered in fulfilling their certificate is the parent's level of education, which consistently influences birth registration. The ownership of certificates in children whose mothers are uneducated is only 21%, 42% if the parents have primary education, and 67% if the parents have secondary education in Nigeria (UNICEF, 2013). Therefore, the implementation of electronic signature, which provides convenience in issuing birth certificates, can solve the problem of registration of birth certificates, as mentioned above, so that regencies/cities with a low mean year school parents become regions that benefit more from the implementation of electronic signature. This result also follows the findings in the country of Benin in 2006, which improved its civil registration system to become computerized to increase the number of births (UNICEF, 2013).

Control variables are used to ensure the consistency of research results on the main explanatory variables. After being given the control variable, the independent variable still has a positive effect and becomes significant to the dependent variable. The direction of the model's bias after using the control variable is underestimated bias or negative bias. The coefficient's value on the variable of interest increased significantly after the birth control variable was added. It is caused by the negative relationship between birth and the mean year of schooling; the higher the population's mean year of schooling, the lower the birth rate. Moreover, there is a positive relationship between births and the number of birth certificates; the more births, the more birth certificates will increase. The addition of this birth control variable also increases the R-squared from 0.10 to 0.45. In addition, using this birth control variable also changed the significance level to 1%.

Therefore, a model with the additional control variable is the suitable model to be selected as the estimation result. This choice is in line with Oster (2019), who explains that to see the estimation results of the effect of omitted variable bias (OVB), not enough look at the change in the coefficient because the change in the coefficient will only have value if the control variable can explain the unobservable. Therefore, it is also necessary to see the change in R-squared after using the control variable to identify OVB.

The results show that the first control variable, headcount index (P0), negatively correlates with the number of birth certificates with a value of -5.276 and significant. These results are consistent with previous studies, which state that birth certificate ownership is uneven according to economic status in several countries, such as Indonesia, Mali, and Vietnam (Unicef, 2013). Another study shows that for households that are among the poorest 30% in Indonesia, 71% of children under one year of age do not have a birth certificate (Sumner & Kusumaningrum, 2014). Poor have complex problems in accessing civil registration services, such as the high cost of obtaining these documents (41%), the long distance to the service office (15%), and the lack of understanding on how to obtain these documents (12%), as well as the complex process that must be lived (9%) (Sumner & Kusumaningrum., 2014). The second control variable, total population, has a positive correlation with the number of birth certificates with a value of 0.288 but not significant. The third control variable, internet access, positively correlates with the number of birth certificates, with a value of 498.1 but not significant. This result follows the conditions after the implementation of electronic signatures; civil registration services, especially the processing of birth certificates, are carried out online. The fourth control variable, births, has a positive correlation with the number of birth certificates with a value of 0.472 and is significant at the 1% level. Before the implementation of electronic signatures, civil registration services were often complex for the public to access, one of which was due to transportation costs to access civil registration services. However, after the implementation of electronic signatures, transportation costs to access civil registration services disappeared. Besides that, implementing electronic signatures also eliminated the need for security printing paper previously needed in printing birth certificates.

Table 5. Cost Benefit Analysis

	Unit price	O. H.	Number of Birth Certificates	
Panel A : Manfaat				Rp 387.000.000
Security Printing Paper	Rp 5.500	4	4500	Rp 99.000.000
Transportation costs	Rp 16.000	4	4500	Rp 288.000.000
Panel B : Biaya				Rp 376.000.000
Servers and Storage	Rp 100.000.000	1		Rp 100.000.000
Computer	Rp 18.000.000	7		Rp 126.000.000
Internet subscription	Rp 150.000.000	1		Rp 150.000.000
Panel C: Cost-Benefit Ratio				
Rasio Manfaat - Biaya				1.029

So that the implementation of an electronic signature can save the costs required to access civil registration services; however, implementing an electronic signature also requires a lot of money, so it is crucial to estimate the costs and benefits that arise. In calculating costs and benefits, the assumption is that this calculation only considers the costs and benefits arising from the issuance of birth certificates.

At least two assumptions arise from benefits: cost savings from printing security paper (previously needed to print two copies of birth certificates and two copies of family cards) and transportation costs for arranging certificates before they were issued electronic signature implementation. Assuming that the average number of birth certificates issued after electronic signature implementation is 4500 documents.

Meanwhile, the costs incurred came from adding the SIAK server and storage capacity, adding computers, and internet subscriptions. Table 4.4 summarizes the calculation of the benefits and costs of implementing electronic signature, while Panel C compares the benefits and costs of implementation. These results show that every rupiah of costs incurred generates benefits of up to 1.029 rupiahs. These rough estimates suggest that electronic signature implementation of online birth certificate issuance is cost-effective

4. Conclusion and Recommendation

This study found that implementing electronic signatures can increase the number of birth certificates by 291 and is significant at the 1% level in regencies/cities with low mean years of schooling parents. This study proves that the implementation of electronic

signatures in regencies/cities with low mean years of schooling parents positively impacts increasing the number of birth certificates.

This finding also supports previous research which examined the impact of electronic signature implementation, which increased the effectiveness of issuing family cards as evidenced by an increase in the number of family cards issued by Disdukcapil Kota Solok in 2019-2020 compared to 2018-2018 (Rizqiqa & Amalia, 2021). Also, research on the impact of electronic signature implementation on civil registration service in Wonogiri Regency has caused the percentage of family card ownership to increase after the implementation of electronic signature (Septiana, 2021).

However, the results for the number 291 were relatively low compared to the average number of birth certificates in the control group before the implementation of electronic signature, namely 4143, or approximately an increase of around 7.02% of the average number of birth certificates issued by Disdukcapil district cities each year. Moreover, compared with the average number of births in the control group before the implementation of electronic signature, which was 7786, it approximately increased by 3.73% of birth certificate ownership. Based on data for 2021, the rate of birth certificate ownership for children under one year of age is only 52%, meaning that this increase is not too significant in increasing the coverage of birth certificate ownership where ideally, birth certificate ownership reaches 100%.

In addition, this study also found economic benefits by comparing the benefits obtained with the costs incurred, where each 1 rupiah of costs incurred generates 1.029 rupiahs of benefits. So the implementation of electronic signature can answer the problem of difficult access to civil registration services prior to the implementation of electronic signature in urban districts with a low average parental length of schooling but has a relatively low effect on increasing the number of birth certificates in addition to providing a positive economic impact. Nevertheless, only relying on this policy, the target of fulfilling the coverage of birth certificate ownership will be challenging to achieve.

Therefore, the authors recommend that the government make other policies to encourage higher levels of birth certificate ownership. In addition, it is also necessary to increase socialization related to changes in civil registration services that already use online media, which are more accessible, so that the community's paradigm that was previously related to the difficulty of civil registration services will change. In addition, it is also important to socialize the importance of civil registration documents.

References

Amo-Adjei, J., & Annim, S. K. (2015). Socioeconomic determinants of birth registration in Ghana. BMC international health and human rights, 15(1), 1-9.

Angrist, Joshua, and Piscke, Jörn-Steffen (2014), Mastering' metrics: The path from cause to effect. Princeton: Princeton University Press. 304pp.

Bhatia, A., Ferreira, L. Z., Barros, A. J., & Victora, C. G. (2017). Who and where are the uncounted children? Inequalities in birth certificate coverage among children under

five years in 94 countries using nationally representative household surveys. International journal for equity in health, 16(1), 1-11.

Corbacho A, Osorio R. Travelling the distance: A GPS-based study of the access to birth registration services in Latin America. Inter-American Development Bank Working Paper Series No 64458. 2011.

Dow U (1998) Birth Registration: The 'first' right. New York: UNICEF, 1998

Gultom, Y. M. L. (2019). Governance structures and efficiency in the US. electricity sector after the market restructuring and deregulation. Energy Policy, 129(March), 1008–1019. https://doi.org/10.1016/j.enpol.2019.02.005

Lepanto, L. (2003). Impact of electronic signature on radiology report turnaround time. Journal of Digital Imaging, 16(3), 306-309.

Lucas, B. A. M., & Mbiti, I. M. (2015). Access, Sorting, and Achievement: The Short-Run Effects of Free Primary Education in Kenya. Applied Economics, 4(4), 226–253.

Mapoma, C. C., Munkombwe, B., Mwango, C., Bwalya, B. B., Kalindi, A., & Gona, N. P. (2021). Application of verbal autopsy in routine civil registration in lusaka district of zambia. BMC Health Services Research, 21, 1-11. doi:https://doi.org/10.1186/s12913-021-06427-y

Mikkelsen L, Phillips D, AbouZahr C, Setel PW, de Savigny D, Lozano R, et al. A global assessment of civil registration and vital statistics systems: monitoring data quality and progress. Lancet, https://doi.org/10.1016/S0140-6736(15)60171-4. 2015

Mirchandani, D., Johnson Jr, J., and Joshi, K. 2008. "Perspectives of Citizens Towards E-Government in Thailand and Indonesia: A Multigroup Analysis," Information Systems Frontiers (10:4), pp. 483-497

Muralidharan, K., & Prakash, N. (2013). Cycling to School Increasing Secondary School Enrollment for Girls in India.

Mulgan, G., & Albury, D. (2003). Innovation in the public sector. Strategy Unit, Cabinet Office, 1(1), 40.

Oster, E. (2019). Unobservable selection and coefficient stability: Theory and evidence. Journal of Business & Economic Statistics, 37(2), 187-204.

Pais, M. S. (2002). Birth registration: right from the start. UNICEF Innocenti Digest, 9, 1-32.

Pärna, O., & Von Tunzelmann, N. (2007). Innovation in the public sector: Key features influencing the development and implementation of technologically innovative public sector services in the UK, Denmark, Finland and Estonia. Information Polity, 12(3), 109-125.

Rizqiqa, E. D., & Amalia, R. (2021). Efektivitas Pelayanan Penerbitan Kartu Keluarga Melalui Tanda Tangan Elektronik Di Dinas Kependudukan Dan Pencatatan Sipil Kota Solok Provinsi Sumatera Barat. Jurnal Media Birokrasi, 29-43.

Rusli, A. (2004). Telematika Indonesia Kebijakan Dan Perkembangan Tim Koordinasi Telematika Indonesia. Jakarta: Kementrian Komunikasi Dan Informasi Republic Indonesia.

Setel, P. W., Macfarlane, S. B., Szreter, S., Mikkelsen, L., Jha, P., Stout, S., ... & Monitoring of Vital Events (MoVE) writing group. (2007). A scandal of invisibility: making everyone count by counting everyone. The Lancet, 370(9598), 1569-1577.

Septinaa, A. A. (2021). Efisiensi Tanda Tangan Elektronik dalam Pelayanan Adminduk Daring di Disdukcapil Kabupaten Wonogiri. Jurnal Jolsic, 9.

Sumner, C. (2015). Indonesia's missing millions: erasing discrimination in birth certification in Indonesia. Center Global Development Policy Paper, 64, 1-35.

Sumner, C., & Kusumaningrum, S. (2014). Indonesia's missing millions: a baseline study on legal identity. Jakarta, Indonesia: Australian Indonesia Partnership for Justice.

Hull, T. H. (2007). 15 Formative Years of Family Planning in Indonesia'. The global family planning revolution: Three decades of population policies and programs, The Word Bank, Washington, DC, 235.

UNICEF. (2019). Birth registration for every child by 2030

Unicef. (2013). A passport to protection: a guide to birth registration programming. New York: UNICEF.

Wasista, R. F. (2020). Analisis Pengaruh Rata Lama Sekolah, Angka Harapan Hidup, Dan Pengeluaran Perkapita Terhadap Penyerapan Tenaga Kerja Perempuan Pada Sektor Formal Di Indonesia (Doctoral dissertation, Universitas Brawijaya).