Impact of the Relationship among Financial Development, ICT and English Proficiency on Income Inequality: Evidence from Malaysia

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Income inequality is a persistent phenomenon and fundamental issue of concern, especially in this new digital era, because unequal access to finance has long been recognized as a critical mechanism for generating persistent income inequality. ICT tools and approaches are being used widely today due to their convenience, omnipresence and economy. This study examines the influence of financial development, ICT, and English proficiency on income inequality in Malaysia during the period of 1979-2019. The empirical results based on the ARDL bounds test indicated that financial development and English proficiency support the hypothesis that both factors can reduce the income gap in the long run. While ICT has shown different results, its improvement has only reduced the income gap in the short term. Hence the need for strengthening ICT policy is crucial as it can lead to development. Mastery of English is also considered to foster economic resilience.

Keywords: *Financial Development; Income Inequality; ICT; English Proficiency.*

JEL Classification: G1, C22

Introduction

Over the last two decades, Malaysia's economic development has benefitted from significant changes in the global economy brought out by the liberalisation, and globalisation of finance and the flows of technology and information development. The development of ICT today is vital component of modern infrastructure, while the use of the English language is also important in its widespread applications throughout world economies. The main features of this development include their rapid pace of technological improvement and their roles as innovation enablers. The financial development in Malaysia has introduced sophisticated financial instru-

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ments that require advanced skills for proper use. The development of ICT allows for closer links between firms, customers, suppliers and collaborative partners (Pradhan et al., 2015). Researchers generally agree that the development of a financial system is associated with income inequality in a way that also depends on the creation of new knowledge in ICT and particular skills to boost productive activities, generate opportunities and enhance the welfare of poor people.

Based on the recent literature, Malaysia's economic development has made significant progress on poverty alleviation, but income distribution has yet to be stabilised. Malaysia has always been sensitive to income distribution issues. Firstly, concern about inequality between ethnic groups dates back long before Malaysian independence when the British enforced the colonial labour policy of "divide and rule". Secondly, in the aftermath of the bloody ethnic riots in May 1969, economic policies shifted their focus to growth combined with more equitable income distribution among ethnic groups, especially the Malays. Income inequality for Malaysia peaked in 1976 and fell thereafter by 1990. According to Shari (2000) and Law and Tan (2009), the general development policies implemented under the New Economic Policy (NEP) from 1971-1990 exerted a major impact on reducing income inequality in Malaysia. However, since 1990 there has been a trend towards widening the income gap.

Shari (2000) stated that the government policy reversal towards liberalization, deregulation and privatization since the late 1980s has contributed to this trend of increasing inequality. Ragayah et al. (2000) also investigated the hypothesis asserting that increasing the income disparity experienced in the 1990s was the result of the changing pattern of industrialization from labour-intensive to capital and technology-intensive. From 1991-2000, the economy was driven by the National Development Policy (NDP), which sought to maximize economic growth through a policy that allowed for free play of market mechanisms and active partici-

pation of private sectors (Economic Planning Unit). The main goal of the NDP was to emphasize sustained economic progress to achieve the status of a fully developed nation by 2020 as envisaged in the long-term plan *Vision 2020*. These policy reforms worked in harmony with the private sector to improve efficiency and productivity in investment. It is argued that, the imbalance in income disparity was caused by the wage rate for skilled workers increasing much faster than that of unskilled workers.

The objective of this study is to empirically examine the long-run relationship between financial development, ICT and English proficiency on income inequality in Malaysia by employing the autoregressive distributive lag (ARDL) bound testing approach to cointegration. In addition, this paper tests the two influential hypotheses in the finance-inequality literature and digital divide literature. The *inequality-widening* hypothesis of financial development by Law and Tan (2009) states that financial development may benefit the rich and well-connected whereas the inequality-narrowing hypothesis posits the idea that when financial sectors grow the poor may gain greater access to it. We also introduced two more variables in this analysis ICT and English proficiency to examine more broadly the consequences of the availability of ICT infrastructure and to relate with people's talents and skills. The development in finance might require other factors for the ability to reap the benefits of new technologies. By combining the ideas of rapid expansion of technology with human capital promotion of technological progress via innovation, this paper also tests the hypothesis of the digital divide because the latter is necessary but not sufficient to reduce inequality.

Previous literature also documented financial development matters for the distribution of incomes and poverty alleviation (Claessens and Perotti, 2007; Demirguc-Kunt and Livine, 2009). Based on these findings we anticipate that financial development not only benefit individuals who are already rich but also facilitates additional benefits in accessing ICT infra-

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structure and individuals skills. These facilities permit investors to exploit new investment opportunities from the improvement in financial access and new technologies in communications.

Literature Review

Past studies have established that financial development reduces income inequality (Clarke, et al., 2006; Bittencourt, 2006 & Liang, 2006). Clarke et al. (2006) examined the relationship between finance and income inequality for 83 developed and developing countries between 1960 and 1995, and discovered that in the long-run, inequality is reduced when financial development increases, as stated by Galor and Zeira (1993). According to Beck et al. (2007), financial development disproportionately raises the income of the poorest quintile and reduces income inequality. In contrast, other studies predicted that financial development may fail to reduce it. Claessens and Perotti (2007) argued that in countries with historically high levels of inequality, distortion in the institutional environment produces unequal access to finance, and ultimately leads to unequal opportunities, which in turn reinforces any initial economic inequality.

The literature shows that limited access to funding and financial services not only reflects economic constraints, but also forms barriers erected by insiders. Banerjee and Newman (1993) revealed that countries with greater financial market imperfections such as information asymmetries and transaction costs that limit access to finance, are more exposed to income inequality. According to this view, finance alleviates poverty both by improving access and by boosting economic growth. Law and Tan (2009) examine the role of bank and stock market developments on income inequality in Malaysia for the period 1980–2000. They found that developments in banks and stock markets are not significantly associated with income inequality.

Empirical studies on financial development as well as economic growth in Malaysia in-

dicated a long-term co-integration between these two variables (Amiruddin et al., 2007). Ang and Mckibbin (2007) utilised data from 1960-2001 and the VECM method to analyse the relationship between financial development and financial liberalization towards economic development. They, discovered only one-way links output growth to long-term bank-based financial development. Tong et. al (2020), on the other hand found that Malaysia cannot rely solely on financial development in its search for long-run sustainable economic growth and stability. Instead, they proposed that the country needs to encourage inward FDI and innovation through a variety of macroeconomics and microeconomic policy measures, to enhance long-run growth rates. These measures include investment and innovation incentivisation via tax reforms and expenditure on R&D to ensure continuous progress in innovation and the establishment of special economic zones.

Based on empirical studies Thagaveli and Ang (2004) focused on Australia and showed that the banking sector has a reactive effect on economic development and with a good stock market comes the generation of growth. Similarly, studies conducted in Turkey indicated that the banking sector is more significantly related to growth than the stock market (Benerhan et al., 2011). Studies on financial development relationships and income gaps should be continued for the country since economic differences will indirectly give a phase difference to financial development as well as economic prosperity. Hence, the emphasis on the high-technology era as well as the enhancement of government policy in digital-based economies is necessary for re-evaluating the relationship between financial development and income inequality to ensure the well-being of society. The integration of systems and processes and ICT services by and with the people, including institutions and service providers, has resulted in the initiation of several projects. Malaysia is hard at work encouraging manufacturers to adopt automation and smart manufacturing concepts and technologies.

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Comparative studies between countries have shown that financial development also reflects the allocation of monetary resources in elevating the quality of life through education and productivity. Thus, society has more options for occupational decisions that can encourage an increase in income distribution, and reduce income inequality (Ridzuan et.al ,2020). Furthermore, Koh et al. (2019) maintained that well-developed financial sectors produce an inequality-narrowing effect in the long-run by facilitating firms to access capital, which is an essential input factor to increase the company's productivity and performance.

Information and Communication Technology

With the progress of the Fourth Industrial Revolution, information and communication technologies (ICT) emerged as a meta infrastructure: i.e., an infrastructure that reconfigures all others into smart systems that accelerate socioeconomic development. Technology can also be a driver of income and wealth inequality because of its skills-bias. Technology innovation has contributed to breakthroughs in providing the poorest with access to basic services. Digital technologies have enhanced access to education and training, including to world leading universities, through massive open online courses (MOOCs). Online e-commerce platforms have enabled small producers to sell their products worldwide and develop new markets in rural areas. Technology offers considerable opportunities, but rewards are not guaranteed. For lower-income and other vulnerable groups to see benefits, research findings suggest that at least three conditions are necessary, including the availability of ICT infrastructure, skills to identify and use technologies and opportunities to access technologies that address the needs of low-income groups.

The rapid development of information and communication technology is generally necessary for a country, ICT development is comprehensive, encompassing mobile subscriptions, internet usage, mobile broadband services, fixed home ICT access and more. According to reports from the International Telecommuni-

cation Union 2016 (ITU), 2016 is the year of implementation towards the goal of sustainable development (SDG). Therefore, to achieve this mission, policymakers and the private sector must fully utilize ICT's potential to achieve SDG. The development of ICT in Malaysia has always gained good support from various parties, especially the government which believes that ICT is one of the strategic drivers to support and contribute directly to economic development. The 8th Malaysia Plan mentioned initiatives to build ICT infrastructure focused on increasing the use of computerization and IT in both government and private agencies.

In line with the development of ICT, daily life has also been facilitated through various digital applications such as E-commerce and advancements in the industrial, educational and health sectors. Among the motives for this ICT development initiative is to create a competitive knowledge-based economy (Jehangir et al., 2011) that may indirectly trigger significant competitive ability and opportunity on a global scale. In addition, technological developments in daily life, especially in education, industrial and commercial sectors adopted ICT use as one of the elements imperative to the needs of the community. As such, the government has allocated more spending on ICT infrastructure through fixed-line telephone and internet access as well as paid public telephone facilities, especially in rural areas. In fact, in 1996, to fulfil the target of Vision 2020 towards achieving Malaysia's advanced status, the government allocated funds to develop the Multimedia Super Corridor (MSC) project as a platform to realise the use of ICT in the country.

It is therefore necessary to use modern ICT approaches and tools to develop better understanding and acquisition of basic skills. Such tools and approaches are presently being used widely due to their convenience, omnipresence, effectiveness and economy. The Malaysian Communications and Multimedia Commission (www.mcmc.gov.my) reported that the penetration of internet use rose to about 77.3% among a population of 32, 454, 455. The Seventh Eco-

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nomic Plan (1996- 2000) has motivated and focused national attention on the necessary development of ICT infrastructure to ensure it is in place to enable the country to move rapidly into the information age. The government also implemented a computer ownership campaign of "one home, one computer" in 2003, which focused on buyers of new computers. On the other hand, for those who were not capable of owning computers the government provided a one stop centre equipped with computer and internet facilities. In the Ninth Malaysia Plan the existing one-stop centres will be upgraded to functional community centres to provide e-service, e-learning, and information exchange.

English Proficiency in Malaysia

English initially spread as a language of international trade and diplomacy under the British Empire, and subsequently during the post-war economic expansion of the United States. In many countries, the use of English has replaced French as an indicator of the well-educated upper class. Globalization, urbanization, and the rise of Internet use have dramatically changed the role of English in the past 20 years. Today, English is one of the most important languages and has played a role in the process of globalization and knowledge explosion and also as the common means of communication throughout the globe. For this reason, English is often termed as a link language, global language and a lingua franca. Alternatively, it is treated as a second language in English as a second Language instruction. At the individual level, English has the potential to generate opportunities, strengthen employability, and expand horizons.

The use of the English language has become vital for better learning and earning in the modern world. It is therefore necessary to develop English language skills among people at every level. The use of computers, the Internet, television, radio, projectors and mobile phones, e-mail facilities, online audio and video conferencing and new applications has made the Teaching Learning Process and Training attractive and convenient. Hence it also play an important role in the learning of language. The

use of English is becoming a basic and essential skill for the entire global workforce, in the same way that literacy has transformed society in the last two centuries. English has transformed from a mere elite privilege into a basic requirement for informed citizenship. Countries and companies that wish to attract foreign investments and trade, as well as stimulate entrepreneurial growth, have recognized the importance of English in creating a business-friendly environment. Malaysia, which ranks second in Asia and 14th globally for a conducive business environment, is praised for its recent commitment to English language instruction. In 2011, Malaysia implemented a national teacher training program to raise the proficiency of all English language teachers to an advanced level designated as C1 on the Common European Framework. (English Proficiency Index 2015: Mixed results across Asia)

English is a key component in remaining competitive and fostering innovation in the marketplace. As English becomes increasingly necessary for interactions in the globalized world, so does the value of proficiency in the language, and conversely, the cost of not speaking the language likewise grows steeper.

Research Methods

Analysis of the causality between time series data through econometric models requires the series to be integrated at the same level. Usually, if the series to comply with this restriction is constrained, it will lead to difficulty in economic interpretation. Thus, the ARDL can overcome this problem. Pesaran and Shin (1999) and Pesaran et al. (2001) mentioned that some variables may not be stationary, some may be integrated and there is also the possibility of integration at different levels ie I(0) and I(1). The ARDL model shows its capability to test for the presence of long term and short-term relationships.

To test the effect of financial development, ICT and English proficiency on income inequality, the following specification of the log-linear

equation is used in the empirical model to examine the relationship:

$$lnGini_t = \alpha_0 + \beta_1 lnfd_t + \beta_2 lnict_t + \beta_3 lnincm_t + \beta_4 inf_t + \varepsilon_t \qquad (1)$$

Where *lngini* is an indicator of income inequality, *lnfd* is financial development, *lnict* is the proxy of information and communications technology, *lnincm* is income per capita and *inf* is inflation rate, ε_t is the error term and the subscript t represents the period.

In this study we also include one dummy variable to take account of the effect of English proficiency on income disparity. The data in the study are from 1979 to 2019. The dummy variable is thus defined by:

$D1_t$ = 1 during the 29 years of 1990-19 and zero elsewhere

Equation (1) is extended to incorporate the dummy variable. The basic income inequality equation is as follows:

$$lnGini_t = \alpha_0 + \beta_0 D_1 + \beta_1 lnfd_t + \beta_2 lnict_t + \beta_3 lnincm_t + \beta_4 inf_t + \varepsilon_t \qquad (2)$$

Equation (2) provides a test of the inequality-widening hypothesis and the inequality-narrowing hypothesis of financial development. If β_1 is positive and significant then financial development will widen income inequality. However, if β_1 is negative and significant then the financial development will narrow the dispersion in income (Law and Tan, 2009). The second hypothesis is based on ICT which is a digital divide. If b is positive and significant then the diffusion of ICT improves income disparity.

The model also includes additional control variables for inequality, namely income per capita and inflation. In theory, it stands to reason that income per capita may improve income distribution because the more capital is available the higher the income per capita as suggested in exogenous growth theories. Thus, inflation worsens income inequality because it reduces the general purchasing power for all but hurts

the poor and middle-income groups more than the wealthy (Shahbaz & Islam 2011). The coefficients of β_3 and β_4 are expected to be negative and positive, respectively. Model (2) is estimated based on the entire sample using the bound test proposed by Pesaran et al. (2001).

Bound Test (Unrestricted Error Correction Model)

The ARDL bounds test was conducted as proposed by Pesaran et al. (2001) to examine the cointegration relationship between financial development, ICT, and English proficiency on income inequality. This test was considered because it does not impose restrictive assumptions that all variables must be integrated in the same order as with several approaches to cointegration. Example of such approaches include, the Engle-Granger (1897) test and the maximum like-lihood based Johansen (1991, 1992) test and the Johansen and Juselius (1990) test. Secondly, the bounds test is suitable for a small sample size. Given that this study was only limited to a total of 38 observations, conducting a bounds test is appropriate. The ARDL also applies regardless of the order of integration and as such I(0) or I(1) is no longer a sensitive issue and thus one can bypass the unit root tests. The following ARDL [p,q,r,s,t] model will be estimated to test the cointegration relationship between the income gap and financial development, ICT and English proficiency and two control variables. The unrestricted error correction method (UECM) was used to examine the long-run and short-run relationship.

$$lnGini_t = C_1 + \sum_{i=1}^{P} \beta_{1i} \Delta lnGini_{t-i} + \sum_{i=0}^{q} \beta_{2i} \Delta lnfd_{t-i}$$
$$+ \sum_{i=0}^{r} \beta_{3i} \Delta lnict_{t-i} + \sum_{i=0}^{s} \beta_{4i} \Delta lnincm_{t-i}$$
$$+ \sum_{i=0}^{t} \beta_{5i} \Delta inf_{t-i} + \varphi_1 lnGini_{t-1} + \varphi_1 lnfd_{t-1}$$
$$+ \varphi_1 lnict_{t-1} + \varphi_1 lnincm_{t-1} + \varphi_1 lninf_{t-1} + \varepsilon_t \quad (3)$$

Where, Δ is the first difference operator and, ε_t is error term. Meanwhile p, q, r, s and t denote the autoregressive lag orders of the variables $\Delta lnGini$, $\Delta lnfd$, $\Delta lnict$, $\Delta lnincm$ and Δinf, repectively. The above equation is estimated

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consistently by the ordinary least square (OLS) technique. Next, the presence of cointegration can be traced by restricting all estimated coefficients of lagged level variables to equal zero. That is the null hypothesis is

$$H_0 : \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = 0$$

$$H_1 : \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq 0$$

In ARDL bound testing, if the calculated F-statistic exceeds the upper critical bound then we reject the null hypothesis and conclude that the series are cointegrated. If it is below the lower critical bound we do not reject the null hypothesis of no cointegration. If the calculated F-statistic is between the upper critical bound and the lower critical bound, then the decision about cointegration is inconclusive. The ARDL bounds testing approach to cointegration uses the $(p + 1)^k$ formula to estimate the number of regressions. The p indicates the maximum number of lags utilized and k the total number of variables (Shahbaz & Islam 2011). The critical bounds of this study are taken from Pesaran and Pesaran (1997) and Narayan (2004a; 2004b; 2005). As an additional contribution to the literature critical values based on Narayan are more suitable for small sample sizes ranging from 30 – 80 observations (Narayan 2005).

The diagnostic tests check for auto correlation which are LM Breush-Godfrey and ARCH, are applied in this study. The stability test of long-run and short-run parameters is checked by using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMQ) of recursive residuals.

Data

This study uses annual data in the context of Malaysia covering the period 1979-2019. In 1979 the changes in education were largely introduced and the use of English was limited since the government aspired to strengthen the Malay language as the mother tongue of the nation. The data were sourced from Global Financial Development Database (GFDD), Standardize World Income Inequality Database (SWIID), Department of Statistic Malaysia

(DOSM) and World Bank Development Indicator (WDI). Financial development was measured by the credit given to the private sector. The proxy for financial development used credits to the private sector. Law and Tan (2009), credit the private sector as a relevant proxy in their study as it measures opportunities for new investors. According to Beck et al (2000) and Livine et al (2000), if the amount of credit to the private sector is high then its is indicative of rapid growth for the country.

In addition to using the above financial development indicator, this study also employs two other variables in the analysis of ICT which were measured by penetration rates for fixed telephone line services (for every 100 people). This proxy was used as a fixed line rate between long-used communications tools in the country. The externalities of the network from this communication infrastructure can indirectly benefit consumers since their large number indicates the value and benefits enjoyed by the users (Azmi & Said, 2007). Furthermore, the development of telecommunications infrastructure can connect rural and urban areas, thus increasing the contribution to economic growth and enhancing the standard of living of the community especially in rural areas. Generally, the rapid development of telecommunications infrastructure can reduce transaction costs, improve market information and improve the efficiency of the services sector, thereby improving the standard of living for the community.

The Gini coefficient is obtained from the Malaysian Statistics Department to gauge income inequality and the measurement of this index can be used to determine the distribution of income. In addition, the Gini coefficient is based on measurements of 0 and 1, with '0' as the fair distribution of income, while '1' is the converse. The Gini coefficient is measured based on the distribution of household monthly gross income. Annual data on income per capita is based on the 2010 constant price and the inflation rate is a percentage of the consumer index.

This study also includes dummy variables to de-

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Table 1. Unit Root Test Dickey Fuller (ADF)

Test	ADF (level)		ADF(1st Diff)	
Variable	Intercept	Intercept with trend	Intercept	Intercept with trend
lnGini	-0.6305	-1.744	-6.418	-6.8780
	(0.851)	(0.711)	(0.000)***	(0.000)***
lnFd	-2.278	-2.383	-2.48	-2.449
	(0.184)	(0.381)	(0.128)	(0.349)
lnICT	-1.789	-1.707	-1.708	-1.990
	(0.379)	(0.727)	(0.418)	(0.586)
lnIncm	0.087	-7.070	-3.547	-4.453
	(0.942)	(0.000)***	(0.014)**	(0.006)***
Inflation	-3.329	-3.675	-6.623	-6.803
	(0.020)**	(0.036)**	(0.000)***	(0.0002)***

Note: Within the t-statistic values () are the probability values, (*) is significant at 10%, (**) at a significance level of 5%, and (***) at a significance level of 1%. * is the probability value of MacKinnon (1996) P one end point value.

termine the proficiency of the English language based on the government policy to strengthen English usage over two study periods. For the first period 1979-1989, it was assumed that the convergence of English proficiency level was not a vital issue since the Malay language was declared the medium of communication in all schools. Subsequently, in the second period of study 1990-2019 it was assumed that English proficiency had been re-attested since it was recognized that the level of English proficiency was very important especially in the era of globalization when nearly 99% of global information is delivered in the English-language in all aspects including changes of career structure, education, skills training and lifestyle patterns (Maharam, 2016).

Language penetration depends on the policy and programs conducted by the Ministry of Education to promote English as a second language with wide usage in speaking and international communication. The interchange of educational policies on English language competence and proficiency is based on a dummy variable with two possible outcomes referring to the implementation of educational policy. According to the National Education Policy, students at all educational levels are required to take English language studies as it is considered an important second language in the Malaysian educational system (Gill, 2002). The indicator in the Gini index, measures the dynamic character of social factors impacting income inequality. Reduced income disparity is facilitated by improvements in education, particularly in Eng-

lish proficiency, and improvements to Malaysia's national education policy. For the sake of consistent estimations of additional parameters, this procedure might be essential.

Results and Discussions

Before conducting the bounds test, the time series properties of the variables were examined using unit root tests. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were employed to determine the order of integration of the variables. The ADF results indicate that all series, except for lnFd and lnICT were stationary after first differencing, i.e they were at I(1) variables. PP test statistics showed that all variables, except for lnICT, were stationary at I (1) with and without trend, and mostly at the 1% significance level. The test for unit root was intended to ensure that none of the series is integrated at I(2) or higher. Although the ARDL approach does not require pre-testing the series as non-stationary, an order of integration of I(2) or higher can make the results unreliable (Shahbaz & Islam, 2011). This feature makes the ARDL bound testing approach the method of choice for examining cointegration.

The results of the ARDL bounds test are shown in the Table 3. Based on the bound test two sets of critical values provide critical values bounds for all classifications of the regressors into purely I(1), purely I(0) or mutually cointegrated. Rejecting the null hypothesis means if the F-test statistic exceeds the respective upper critical values, it can be concluded that a long-run relationship exists between the variables re-

Table 2. Unit Root Test Phillip Perrons (PP)

Test	PP (level)		PP (1st diff)	
Variable	Intercept	Intercept with trend	Intercept	Intercept with trend
lnGini	-0.630	-1.753	-6.418	-6.345
	(0.857)	(0.706)	(0.000)***	(0.000)***
lnFd	-3.262	-2.618	-5.312	-5.490
	(0.027)**	(0.2747)	(0.000)***	(0.004)***
lnICT	-4.376	-1.535	-1.700	-2.088
	(0.0013)***	(0.798)	(0.423)	(0.534)
lnIcm	0.2771	-2.451	-4.606	-4.672
	(0.934)	(0.349)	(0.007)***	(0.003)***
Inflasi	-3.296	-3.727	-8.458	-8.423
	(0.022)**	(0.032)**	(0.000)***	(0.000)***

Note: Within the t-statistic values, () are the probability values, (*) is significant at 10%, (**) at the significance level of 5%, (***) at the significance level of 1%. * is the probability value of MacKinnon (1996) P one end point value.

Table 3. Bound Test for Cointegration Test

Null Hypothesis: No Cointegration					
Computed F-statistic	Significance level	Critical Value (Pesaran)		Critical Value (Narayan)	
		Below	Above	Below	Above
5.610	1%	3.74	5.06	4.59	6.36
	5%	2.86	4.01	3.27	4.63
	10%	2.45	3.52	2.69	3.89

Note: The sum of K(independent variables) is 4.

gardless of the order of integration of the variables. An inconclusive result is reached if the F-test statistics lies between the upper bound and lower bound. According to the computed F-statistic, we have enough evidence to reject the null hypothesis of no cointegration and prove that there is a long-term relationship between income inequality, financial development, ICT, income per capita, inflation and English proficiency. In addition, the computed F-statistics were also based on the critical values in the Narayan (2004) table as the total observation in this study was only 40. That is, the computed F-statistic for these models is 5.61 which is above the upper bound critical value of 5.06. This proves that there exists a steady state long run relationship amongst income inequality, financial development, ICT, income per capita, inflation and the dummy of English proficiency.

Once the existence of a long-term cointegration relationship is confirmed, the conditional ARDL for the long-term model can be estimated. There is a tendency for variables to move towards a long-term balance. Tables 4.0 and 4.1 show estimates of long-term coefficients by using the ARDL model and the results of the error correction model (ECM). This study selects the ARDL model (2, 3, 1, 0, 2) to illustrate that

the interval required by each variable affects the income imbalance. Short-term versions of the lat-lat model ARDL are selected based on AIC since it is more suitable for a smaller sample than SBC. Additionally, the adjustment value for the ARDL model indicates that 63 percent of the variables are explained by the independent variables.

The long-run elasticities of income inequality with respect to financial development, ICT, income, inflation and English proficiency dummy are reported in Table 4.19. The empirical results indicate that the financial development indicator is a significant determinant of income inequality irrespective of the banking sector. The ICT indicator and inflation however are negatively correlated with income inequality and statistically significant, while income and the dummy English proficiency are negatively significant determinants of income inequality as well. It appears that English proficiency is based on the programme implemented by the government beginning in 1990, intended to strengthen the English language usage, has a significantly positive impact on income distribution.

The robustness of this model has been confirmed by several diagnostic tests, such as the

Table 4. Unrestricted Error Correction Model of the Income Inequality Equation (Dependent Variables: LnGini, estimated period: (1979-2019)

Variables	Coefficient	Std. Error	t-Statistic
ECT(-1)	-0.515	0.121	-4.224***
ΔlnFd	-0.013	0.040	-0.337
ΔlnFd(-1)	-0.067	0.043	-1.551
ΔlnFd (-2)	0.072	0.044	1.619
ΔlnFd (-3)	0.049	0.037	1.315
ΔlnICT	-0.159	0.124	-1.287
ΔlnICT (-1)	0.317	0.124	2.552**
ΔlnIncm	-0.107	0.023	-4.657***
ΔInflation	0.004	0.002	1.858*
ΔInflation(-1)	0.0006	0.002	0.271
ΔInflation(-2)	0.004	0.002	2.005**
D2	-0.039	0.024	-1.622
C	3.421	0.739	4.629***
R-squared	0.638	F-statistic	3.261
Adjusted R-squared	0.442	Prob f-statistic	0.005
AIC	-4.804	Dubin-Watson stat	1.848

Note: Estimation is based on conditional ECM using ARDL (2,3,1,0,2). The number ( ) is lat and *.**, and *** indicate significance at the 10%,5% and 1% levels, respectively.

Table 5. Long-run Elasticities of Income Inequality in Malaysia (DV: LnGini estimated period 1979-2019).

Variables	Coefficient	Std. Error	t-statistic
constant	6.642	0.524	12.66***
lnFd	-0.394	0.099	-3.98***
lnICT	0.306	0.083	3.65***
lnIncm	-0.208	0.042	-4.94***
Inflation	0.018	0.006	2.65**
D2	-0.077	0.044	-1.739*

Note: *,**, and *** indicate a significance level of 10%,5% and 1% respectively.

Table 6. Diagnostic Test

Diagnostic Checking	Estimated results
Autocorrelation *(Breusch-Godfrey LM Test)*	0.8354 (0.4470)
Heteroskedastisiti *(ARCH Test)*	0.1804 (0.6733)
Stability *(CUSUM Test)*	Stable at the 95% significance level
Stability *(CUSUM of Square Test)*	Stable at the 95% significance level

Note: ( ) is a probability value.

Breusch-Godfrey serial correlation LM test, Jacque-Bera normality test and Ramsey RE-SET specification test. All tests revealed that the model has the desired econometric properties, the residuals are serially uncorrected and normally distributed and have the correct functional form. Accordingly, this study assesses the stability of the long run relationship between money demand and its determinants. We relied on the CUSUM and CUSUM-SQ tests proposed by Brown et al (1975) to test for the constancy of long-run parameters. This paper applied the tests to the residuals of the model. The CUSUM test is based on the cumulative sum of recursive residuals from the first set of n observations. It is updated recursively and is plotted against the break points. If the plot of the CUSUM statistics stays within the 5% significance level, then the estimates are stable. Figure 1, shows that the parameter is stable over the period of investigation, as seen in the blue lines within the red. The same applies to the CUSUM-SQ statistics, which are based on the squared recursive residuals. As can be seen in Figures 1 and 2, the plot of the CUSUM and CUSUMQ statistics stay within the critical bounds (represented by a pair

Figure 1. Cusum Test Results (straight lines represent critical limits at the 5% significance level)
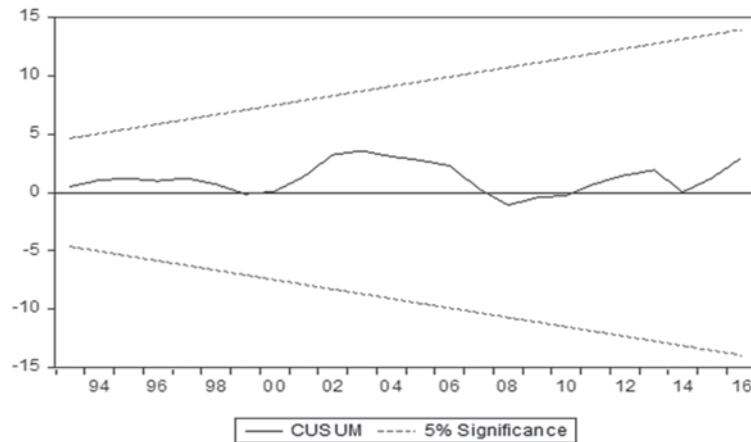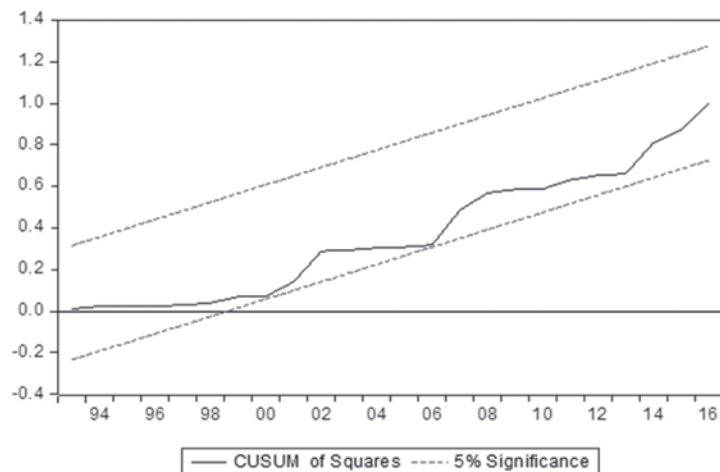

Figure 1. CusumQ Test Results (straight lines represent critical limits at the 5% significance level)

of straight lines) indicating the stability in the variable and it is shown that the blue line does not cross the red line. Its exclusion may lead to the function to exhibit some instability.

Conclusions

This study examined the effect of financial development, ICT and English proficiency on income inequality in Malaysia during the period 1979-2019. The Financial development literature argues in the literature that financial systems have a potentially important role to play in equalizing economic opportunities and reducing inequalities. Therefore, it is important to consider the link between financial development, ICT, English proficiency and income inequality. In addition, the development of ICT as well as the mastery of English can indirectly contribute to a shared economy that is an asset-based social ecosystem that uses digital platforms to create economic value through increased resource use between individuals, businesses and governments. In the transformation from various angles that can increase contribution to socioeconomic growth to improve income distribution, there is a need to place more emphasis on education and human capital. This will increase earning in the lower income segment of the population and make the distribution of income more equitable.

Empirically, basic estimates of this study and sensitivity analysis show that financial development is negative and significant with inequality in the long-term. However, the impact of financial development is positive in the short-term.

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Thus, the relationship between financial development and income inequality in Malaysia is seen to support the long-term inequality-narrowing hypothesis. Conversely, ICT shows the opposite result. In addition, the findings show that English proficiency has a significant impact and a negative sign on income inequality. This suggests that the initiative to improve English proficiency is relevant in reducing the income gap for the long-term especially in English proficiency which is regarded as a crucial quality when looking through job applications. To attain a sustainable economic goal, this component is essential for improving access to capital, facilitating the development of entrepreneurial skills, and enabling students to pursue higher education and receive quality instruction, particularly in the fields of science and technology, which primarily use English as a second language.

The issue of English proficiency has origins in the policies implemented since Malaysia was an English colony before its independence in 1957. As such, some British cultural influences have remained, such as the use of the language in the education process. The English proficiency in Malaysia is at a high level based on the index of English proficiency with a score of 562 (Report EF EPI, 2021). In addition, the role of English proficiency is important and parallels that of ICT advancement. Since 1990, Malaysia has created greater awareness of the influence and function of English as more than 95 per cent of Internet sites use English as the medium of instruction (Hanapiah M. F, 2004). English proficiency is also an important input in human resource development such as efficiency in management and communication skills which indirectly contributes to the dissemination of knowledge and technical skills. As a result, English language proficiency is also able to reduce the gap between the rich and the poor based on the level of education that provides greater opportunities for participation in business and the economy. This is supported by Ismail (2012) who states that employers expect graduates in the job market to have soft skills such as communication skills, English proficiency, and general and current knowledge.

The need to examine the roles and position of English proficiency development in Malaysia and in the world is due to the spread and influence of English that has extended throughout the country. The English language has indeed been declared as the second most important language in Malaysia and is widely used in various fields by Malaysians especially in the era of technology and communications. Therefore, proficiency in English is indirectly influential in certain areas of development such as business, employment, education, politics, tourism, law, media and translation.

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