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A DESCRIPTIVE EXAMINATION OF THE IMPACT OF CANADIAN MORTGAGE STRESS TEST IN LENDING, BORROWING AND AFFORDABILITY

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Abstract: A number of Canadians need to borrow money from lenders to purchase residential properties through mortgage route. The history of existing mortgage system in Canada is more than 100 years old. Canada Mortgage and Housing Corporation (CMHC) was created in 1946 to regulate the industry. There were 4.3 million homes under mortgage debt until 2017 and 0.5 million homes had Home Equity Line of Credit. In 2018, the Banking Regulatory Authority Canada imposed a New Stress Test on mortgage borrowers and changed the criteria of loan approval. Previously, the lenders do not need to test the affordability of those borrowers who put a down payment of 20% or above but now the lenders must need to test the borrowing power of all applicants under higher interest rates imposed by the government rather than the actual rate of interest being offered by lenders to borrowers. The descriptive study examined the influence of stress test in lending process, borrowing capacity of home buyers and loan affordability to pay off the debt under agreed terms. The study explains the current situation of delinquency and possible default after analyzing 370 samples collected from the city of Brampton. The research findings also highlighted the testing criteria, payment frequencies and actual amount to pay off the debt after purchasing.

Keywords: **Stress Test, GDS, TDS, Lender, Borrower, Amortization, Term, Principal, Interest**

I. INTRODUCTION

Since 2018, the Mortgage Stress Test also applies on uninsured home buyers in Canada with minimum down payment of 20% or more and seek remaining mortgage loan from lenders. Under Mortgage Financing Rules of 2016, the borrowers, who put less than 20% down payment, are required to purchase a mortgage default insurance (Loans Canada, 2019). There are many lending institutions in Canada including Finance Corporations, Banks, Credit Unions, Trusts and Private Lenders, who provide mortgage loans to borrowers. A large number of Canadian borrowers (4,843,279) obtained mortgage only through Banks (CBA, 2020). Earlier in 2016, government introduced the Test only for uninsured mortgages, for those borrowers who put less than 20% down when purchasing a residential real estate but the new changes are also being applied on those who put 20% or more in down payment to avoid the cost of mortgage default insurance. The test was aimed to assess the affordability of buyers on higher interest rate than the actual rates offered in the market. Lenders report the financial situations of borrowers to the credit bureaus if their payments are late for a couple of months (Statista, 2020), it the sign of financial hardship and strong affordability issues. According to reports, at least 20% of delinquent mortgages are at risk and there are possible chances of default (Canadian Bankers Association, 2020).

1.1 Research Problem:

Millions of buyers obtain mortgage funding from lenders to purchase residential properties and promise to pay off the principal amount and interest within the agreed term however due to various reasons many borrowers cannot fulfil their commitment, are unable to make the repayments and default the mortgage. Mortgage Investment Corporations (MICs) and Private lenders confirmed 1.73% of delinquency by the borrowers in 2019. Canadian banks also reported 0.24%, Credit Union and Caisses Populaires 0.17% and Mortgage Finance Companies (MFc) testified 0.24% as being delinquent. Normally, Canadian lenders report the situation after 270 days of late payments by the mortgage borrowers. Until the end of July this year, 12,726 residential mortgages provided by Canadian banks were in arrears throughout the country. Royal Bank of Canada indicated, in its research study, the possible chances of default by Canadian borrowers at least one in five deferred cases. It is clear that mortgage Stress Test is imposed to evaluate the financial burden on borrowers in case the mortgage interest rates are increased in future. The curiosity of the research articles is to analyze and describe the overall impacts of Stress Test on mortgage approval process and monthly payments the borrowers make to pay off the debt.

1.2 Objectives:

The research had following objectives to examine the extra financial burden on borrowers under new mortgage "Stress Test" after default insurance and other mandatory expenses.

1. To describe the influences of mortgage stress test on maximum loan approval amount.
2. To calculate the variance in repayments if monthly payment frequency is changed to bi-weekly.
3. To explain the actual difference a mortgage stress test makes on payment amount to pay off the debt.

1.3 Research Questions:

The following research questions were formulated to achieve the objectives of the study:

1. What are the influences of mortgage stress test on maximum loan approval amount?
2. What would be the variance in repayments if monthly payment frequency is changed to bi-weekly?
3. What actual difference a mortgage stress test makes on payments amount to pay off the debt?

II. LITERATURE REVIEW

2.1 Theoretical Framework:

The research followed Asymmetric Information Theory which can be applied to any economic trade even in mortgage approval for real estate purchases. Asymmetric information or failure of information in economic trades happens when one party knows more than other party. In the current discussion, borrowers have greater knowledge about their financial circumstances than lenders in loan approval phase. Lenders have imperfect knowledge and do not know whether borrowers are able to afford the mortgage loan and what would happen when interest rates are increased in future (Akerlof, 1970).

2.2 Literature Review and Calculation Techniques:

Although credit union are not required to implement the "stress test" but a credit union "Vancity" based in Vancouver city has

increased the stress test implementation for the borrowers, according to Vancity's senior VP of risk Rick Sielski (cited in Armina, 2018). The credit union would not disclose the characteristics of the test which is being voluntarily implemented and it is too early for them to gauge the effects of new guidelines which Vancity is implementing. A lender Harold Gerstel, known as Harlod the mortgage, also consider it too early to make any comment on substantially of change but their business was not affected due to the test so far and they are getting more business in a responsible way by serving the market and members (borrowers). The lender agreed that more bars on business are shifting the mortgage business to riskier lenders (cited in Armina, 2018).

Experts have mixed views on the strict regulations as the founder of Ratespy.com and a mortgage planner Robert Melister, who works for the Intelli Mortgage, think that government's rules send better quality demand down the mortgage credit lines through the ladders where lenders with higher risk tolerance but having less restrictions on mortgage activity are enjoying materially more business than before. These lenders can pick the borrowers of their choice being "selective" and also charge the more fees on lending the funds (cited in Armina, 2018).

Usually, realtors do their best to pre-qualify or evaluate the prospective buyers but it is not always accurate as buyers sometimes provide misleading information (Boiron, 2013). Some buyers, when they are not comfortable with the provisions of *FINTRAC* legislation, refuse to provide the requested documents. Realtors are not allowed to represent the clients who deny giving the required document and in result the buyers end-up by walking out the deal (CREA, 2008) however it causes a huge loss to realtors' business (HomeLife, 2010). A majority of realtors don't push their customers to sign the representation documents at the first stage (Lender Edge, 2012).

Lenders also want quality borrowers to lend the money and may approve the mortgage application fast if applicants have no risk or less risk of default (Gray, 2006). There are various mortgage products available in the lending market and first-time buyers should choose the right product from the variety of offered options (Rinomato, 2009). The market value is established when a purchaser and seller of the property are agreed on some price to make the deal (Jalili, 2013). The interest rates of mortgage can be changed based on the prime rate over the time but interest rates stay same in fixed rate mortgages. The borrowers need to make constant payments of mortgage. A variable mortgage allows borrowers to make the less payment if interest rates go down (White, 2010). In the fiscal year of 2012, almost 70 percent of the borrowers between the ages of 18 to 34 chose a fixed rate mortgage to purchase a residential property in Ontario (Dunning, 2012).

Borrowers can pay off mortgage loans before the expiry date of the chosen term if they signed up for an open mortgage in the beginning. This type of mortgages can be paid off to the lenders anytime without penalty (Kurtz, *et al*, 2009). The terms vary according to the situation of financial institutions, they must provide the payment option to the borrowers if they are federally regulated under the Act of 2010 (FCAC, 2010). Lenders don't want to approve the funds beyond the actual market value of the property and this is the reason they ask for appraisal to establish the real value (Donahue, *et al*, 2003). Meanwhile sellers are also required, under clause 15 of OREA agreement of purchase and sales, to provide the statement of existing loan or mortgage to the buyers because the sellers may still have remaining mortgage on the property (RECO, 2009). A visually home inspection is required to inspect the building structure before final purchase of the property (McKernan, *et al*, 2009). Mortgage rules have been changing over the past decade. Lenders carefully review all requirements before approving the funds however according to the estimation of Canadian Association of Accredited Mortgage Professionals, the new mortgage rules restrict nearly 17% of high ratio mortgage borrowers to qualify for loans. The regulations have made it hard for younger buyers to get the mortgage (CAAMP, 2012). If the buyer is a registered corporation in Ontario, they have to meet some extra requirements to qualify for property loan (Donahue, *et al*, 2003), where the corporation is an international entity then they must have an extra provincial license under *Extra-Provincial Corporation Act*, R.S.O. 1990, c.E.27., to apply for the mortgage loan in the province (McKernan, *et, al*, 2009). The new regulations, day by day, are making mortgage application process harder than before and pushing lenders to scrutinize the financing applications on strict grounds (CMT, 2013). A reduced amortization period put some extra financial burden on buyers' pocket and they have to pay roughly $250 to $300 extra every month to return the mortgage loan (REGBV, 2012). Previously, lenders used to approve 85% loan to value amount but the regulator have put a CAP on this practice. Before 2010, many lenders could approve 95% loan to value amount (CBC, 2012). Toronto Real Estate Board also reported the tough market condition due to tighten mortgage rules imposed by the regulations (TREB, 2013). The banks try to increase the approval criteria for different categories of borrowers but applicants still need to follow the standard procedures of financing (RBC, 2011). The realtors and mortgage brokers complaint that a dissatisfied customers tell at least eleven (11) other people about the services those practitioners are providing to them. The customers blame to the industry professionals for not getting approved for mortgage financing (Cotts and Friday, 1995).

Armina (2018) discussed the claim of mortgage brothers about the ratio of mortgage decline, that has been increased up to 20%, by the large banks and traditional lenders. The Banking Regulatory Authority in Canada imposed new regulations on borrowers who do not need mortgage insurance when buying a home. A Mortgage Test was introduced to evaluate the borrowing capacity of applicants. Carmen Campagnaro, President of Pro Funds Mortgage Burlington (as cited in Armina, 2018) stated that after the increased decline due to tighter lending requirements, the home buyers are pursuing to private lenders, mortgage investment corporations and credit unions as they are provincially regulated and are not obligated to implement the stress test.

Canada has a federal government system with 10 provinces and 3 independent territories governed by territorial governmental laws. The major banks and traditional lenders fall under federal category and they must have to follow the "stress test" regulations however province of Quebec somehow has tight mortgage rules for credit unions working in the provincial jurisdictions. The stress test also includes the borrowers whose mortgage is insured in the way that they are being forced to be qualified under the fine-year mortgage rules by the bank of Canada's benchmark.

Canada Mortgage Services (2014) argued that the ratio of mortgage declined by the banks is more than the approvals of mortgage applications. There are various factors the banks consider when evaluating the applications of borrowers. Finally, the borrowers' ability to repay the loans and also the risk assessment is done before the final decision of financing. The first thing banks always consider is the credit history of applicants, the banks review the credit report of consumers and specifically look for any history of non-payment or other delinquencies. This could be happened due to unexpected

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circumstances such as death of a family member and loss of employment but regardless of these reasons, dishonor of payment is a bad sign on credit report and gives an excuse to banks for refusal of mortgage application,

According to (Loans Canada, 2018, FSCO, 2016, FCAC, 2018) the banks are not the only lenders in Canada, and insurance companies, trust companies, loan companies, credit unions, mortgage companies and caisses populairs also offer mortgage funds to homebuyers. Government suggests buyers to talk to the several lenders to secure the best mortgage according to the needs. Borrowers have the option to switch lenders on later date but it is still important to choose a right lender from the day first but if you change your mind after signing a contract, your lender may charge you penalty of prepayment. It is also important to understand the terms & conditions of mortgage contract. The role of mortgage brokers is basically to find a lender but they don't directly lend money to purchase properties. Mostly lenders offer their loan or mortgage products directly to the borrowers but some lenders want borrowers apply through brokers.

III. RESEARCH METHODOLOGY

The study followed Descriptive Research Design through quantitative analysis to answer the research questions and achieve the objective of study. The research identified the previous closed transactions of real estate deals as the target population and 370 samples were collected through Random Sampling Techniques from the sampling frame of identified population. The real estate documents related to closed (completed) transactions in the city of Brampton were studied to collect the primary data for ongoing research. The study, at first stage, analyzed all documents of closed transactions to collect the pricing data of sold properties. The second stage involves the transfer and processing of data to get an average (Mean) price of the sold properties through calculations. After reaching to the unbiased average price, the information was used to analyze the maximum loan approval amount and monthly payment of mortgage under the mortgage stress test. The research used EXCEL software to analyze GDS, TDS ratios and calculate maximum possible amount of mortgage and minimum required monthly mortgage loan payment according to the Mortgage Stress Test criteria. The study used two different prices for analysis where one price was a sample price based on secondary data and other one obtained through primary data after calculating the MEAN price of the sold residential properties. It helped the researcher to avoid any bias in base pricing for the final analysis. The questions 1 and 2 were answered by the direct analysis and question 3 was answered based on the analysis results of first 2 research questions.

3.1 Interest Rate under Stress Test:

The bank of Canada had 5% interest rate for 5 years-conventional mortgage in December 2019 however another lender was offering the same mortgage for 2.99% annual interest. According to the regulations, a further 2% will be added into 2.99% which becomes a total of 4.99% interest rate but the percentage of interest fixed by the Bank of Canada is still higher than the offered rate by the lender. So the Bank of Canada's fixed rate 5% is still higher and it will be applied under stress test to evaluate the affordability of borrowers. Another product of mortgage was offered to the borrower on 3.99% interest with some flexible term and after adding up 2% extra, the total payable interest rate becomes 5.99% which is obviously higher than the fixed rate by the Bank of Canada. In the above scenario, the later rate offered by the lender will be applied to the entire mortgage term. The policy makers claim that they are trying to protect the housing industry to make sure the spending of residents are under control.

TABLE 1: Mortgage Default Insurance under "Stress Test"

Description of Mortgage	
Annual Household Gross Income	$60,000.00
Price of a Chosen Property	$325,000.00
Down Payment	20%
Annual Interest Rate	5%
Amortization Period	25 Years
Mortgage Term	5 Years
Payment Frequency	Monthly Payments
Requested amount of mortgage	$260,000 ($325,000-$65,000)
Mortgage Loan Insurance Premium	$0.00 ($260,000X0.00%)
Total Mortgage Amount Required	$260,000

Source: Calculated by the Author

In the above scenario, a borrower whose annual household gross income is $60,000, is purchasing a property valued at $325,000. If the amount of down payment is 20% then $65,000 are needed before the approval. The buyers would not need to purchase default mortgage insurance when the amount of down payment is 20% are more. The required amount of mortgage would be $260,000 based on 5 years' mortgage term, 25 years of amortization and the interest rate of 5%. The qualification of mortgage is determined on Gross Debt Service (GDS) and Total Debt Service (TDS).

TABLE 2: GDS and TDS Ratio Calculations (Case 1)

GDS Ratio Calculation		TDS Ratio Calculation	
Mortgage Payment	$1,512.17/ month	GDS Ratio Cost	$1,862.17/ month
Heating Cost	+$150.00/ month	Credit Card/LOC	+$100.00/ month
Property Taxes	+$200.00/ month	Car Payment	+$350.00/ month
GDS Ratio Cost	=$1,862.17/ month	TDS Ratio Cost	=$2,312.17/ month
Gross Income	÷5,000/ month	Gross Income	÷$5,000.00/ month
GDS Ratio	=37.24%	TDS Ratio	=46.24%

Source: Calculated by the Author

According to results of above calculations, the borrower most likely to be denied for a mortgage of required amount that is $260,000 because either the GDS ratio (37.24%) is exceeding the allowable ratio of 32.00% or the TDS ratio (46.24%) is exceeding the permitted ratio of 40.00%. However, there is an exception that a borrower in the above situation may still qualify for a mortgage in case their GDS and TDS ratios are slightly higher than the allowable limits but the calculations mean that borrower is increasing the risks of debt that is higher than the debt they could afford. The borrower only had two debt payments including credit card and car loan that is a total of $450.00 but does not qualify for the mortgage. Generally, borrowers have other debt payments like OSAP study loans, business loan, gambling debt, CRA debit and other personal loans (Legal Line, 2018).

As per new provision, a mortgage loan insurance plays an important role in deciding the interest rate when borrowers apply for mortgage and lenders pick the rate of interest to run the stress test. The banks must use the higher rate of interest when a borrower does not require having mortgage loan

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insurance. In this case, banks will use either the rate of interest when announced by the bank of Canada for the 5 years' conventional mortgage or the interest rate a borrower negotiate with the lender, plus an additional 2% in it. The latest situation describes that if a borrower whose annual gross income is $60,000 picks a residential property with the value of $325,000 and put 20% down on 5% interest rate, where amortization period is 25 years, mortgage term of 5 years and payment frequency is monthly, needs a mortgage amount of $260,000 to purchase the property. It is understood that borrower's annual income is $60,000 but we calculated the anticipated expense. The data would reveal that borrower will have to pay property tax of $200 every month and the payment of $150 for the heating cost, $100 only for the credit card or line of credit payment and $350 for the car payment.

After the Stress Test policy, now borrowers are required to prove at a qualifying interest rate that they could afford the mortgage. The qualifying rate is higher than the actual interest rate in the contract of mortgage. It means that borrowers will pay back the lower interest rate, when they actually make the mortgage payments to lenders but when they are assessed by the lenders for mortgage affordability, they must have to pass the test by assuming the higher than actual rate of interest. Borrower cannot qualify for a loan at banks unless they pass the above mentioned stress test. We already discussed that new regulations apply on federally regulated financial institutions like banks however credit unions and other lenders do not need to apply the test on their customers because those institutions are not federally regulated.

TABLE 3: GDS and TDS Ratio Calculations (Case 2)

GDS Ratio Calculations		TDS Ratio Calculations	
Mortgage Payment	$,512.17/month	GDS Ratio Cost	$1,862.17/month
Heating Cost	+$150.00/month	Credit Card, LOC	+$0.00
Property Taxes	+$200.00/month	Other Debit	+$0.00
GDS Ratio Cost	=$1,862.17/month	TDS Ratio Cost	=$1,862.17/month
Gross Income	÷$5,833.33/month	Gross Income	÷$5,833.33/month
GDS Ratio	=31.92%	TDS Ratio	=31.92%

Source: Calculated by the Author

In the above scenario, the borrower/buyer whose gross income is $70,000 per year pursues to purchase the same property under same amount of down payment, interest rate, amortization period, mortgage term and payment frequencies with the exception of zero debt ($0.00) at all. When lenders use above calculations to determine the mortgage affordability, this borrower most likely to be approved for the required mortgage amount of $260,000 since the GDS ratio (31.92%) does not exceed 32.00% and TDS ratio which is also (31.92%) not exceeded 40.00%.

TABLE 4: Required Loan and Maximum Mortgage on Value

Estimated value of the property:	$325,000.00
Down Payment:	-$65,000.00 or 20.00%
Mortgage Amount Required:	$260,000.00
Mortgage Loan Insurance Premium:	+$0.00 or $0.00%
Total Mortgage Amount Required:	$260,000.00

Source: Prepared and calculated by the Author

The value of a property and amount of down payment is also considered carefully when lenders determine the mortgage application of borrowers. Since the GDS ratio (31.92%) is not exceeding 32.00% and TDS ratio (31.92%) is also not exceeding 40.00%, the borrower is likely to be approved for the requested mortgage loan amount of $260,000. Under the above GDS and TDS ratios, a borrower could qualify for a maximum mortgage amount of $260,772.64 or a property that cost a maximum of $325,965.80 based on the same percentage of down payment (20%).

TABLE 5: Required Mortgage Details

Mortgage Amount Required:	$260,000.00
Interest rate:	5.00%
Amortization Period	25 Years
Monthly Mortgage Payment	$1,512.17 A (Amount "A" will be used in GDS Cost Calculation.

Source: Prepared and calculated by the Author

As discussed above, Gross Debt Service (GDS) and Total Debit Service (TDS) ratios are used by the mortgage lenders to verify whether a borrower would qualify for the requested amount of mortgage. According to the details of required mortgage, a borrower needs the loan of $260,000 with 25 years of amortization period where the interest rate is 5.00%. The borrower would be required to make a monthly payment of $1,512.17 to pay off the mortgage loan.

TABLE 6: Gross Debt Service (GDS) Cost

Heating Cost	+$150.00/month
Property Tax	+$200.00/month
Mortgage Payment	+A ($1,512.17/month)
Total TDS	=$1,862.17/month B
GDS Cost	Amount "B" will be used in GDS ratio, TDS cost and TDS ratio calculations

Source: Calculated by the Author

The above table shows the Gross Debt Service cost. GDS is the ratio of the essential payments that a borrower cannot avoid to make for the home (including mortgage payments) to the gross income. GDS ratio must not exceed 32.00% to qualify for the mortgage. The above table calculated the monthly heating cost and property tax. The cost of heating means the expense of gas or electricity needed to run the furnace/heater in the house. After including the monthly heating cost of $150.00 and monthly property tax of $200.00, the total liability would be $1,862.17 payable every month.

TABLE 7: Total Debt Service (TDS) Cost

Credit Card/LOC	+$0.00/month
Car Payment	+$0.00/month
Other Debit Payments	+$0.00/month
GDS Cost	+B($1,862.17/month)
Total Debit Service	=$1,862.17/month C
TDS Cost	Amount "C" will be used in TDS ratio calculations

Source: Calculated by the Author

TDS is the ratio of all household debits (including the mortgage payment) to the gross income. A borrower's TDS ratio must not exceed 40.00% normally. When there are payments toward credit cards, line of credit, car loan or any other debit, the total monthly liability will stay the same as $1,862.17.

TABLE 8: Justification of Calculations

Borrower's Gross Income	$5,833.33/month D
GDS Ratio	B÷D=$1,862.17/month÷$5,833.33/month= 31.92%
TDS Ratio	C÷D=$1,862.17/month÷$5,833.33/month=31.92%

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Source: Calculated by the Author

The above table shows the calculations and justifies that borrower's GDS ratio is 31.92% but not exceeding the maximum limit of 32.00%. TDS ratio is also calculated as 31.92% which is not too close to 40.00%. The income information indicates that borrower is earning a gross of $5,833.33 every month and the liability to pay is $1,862.17. Under both GDS and the TDS ratios, the borrower can qualify for the mortgage loan.

TABLE 9: Calculation Summary for the Term

Category	Term	Amortization Period
Number of Payments	60	300
Mortgage Payment	$1,512.17	$1,512.17
Principal Payment	$29,880.49	$260,000.00
Interest Payment	$60,849.90	$193,651.89
Total Cost	$90,730.39	$453,651.89

Source: Calculated by the Author

The above calculations indicate the future expense of the property includes mortgage principal and interest. A daily life in Canada may encounter various types of expenses which include but not limited to child support, any secondary mortgage for a home or cottage, child care fees or money the people save for their children's education. The borrowers might need some credit in future for replacing their existing car or buying a second one, new furniture, renovation of the house and a trip or travel. The experts recommend that borrowers should recalculate the mortgage amount if any of the mentioned situations is happening in the near future to get the more realistic picture of financial planning. Financial Consumer Agency of Canada (FCAC, 2018) advises the borrowers to think critically about the closing cost, land transfer tax, municipal tax adjustments, lawyers' fees and moving expense and transportation when applying for a mortgage loan to purchase residential properties.

The mortgage lenders verify the credit file of borrowers before approving the application of mortgage loan and they expect the borrowers to provide the proof of income. The borrowers who transfer their existing mortgage to new lender may need to get approved/re-qualify with the new lender. Some borrowers take a mortgage with a term that is less than 3 years and the mostly lenders will calculate the interest rate of the mortgage based on the rate which is equivalent of 3 years' term. The borrowers also need to think if the interest rates go up during the time of their mortgage renewal, and would it be affect their mortgage affordability. Financial Consumer Agency also advises the consumers to be very vigilant about the credit cards, line of credit or other revolving credit they have because the limits of those credits can be used by the financial institutions to determine the minimum payment a borrower need to make in the calculation of TDS ratio (FCAC, 2018).

TABLE 10: Mortgage Payment Plan

Mortgage Amount	$325,000.00
Interest Rate	5.00%
Amortization Period	25 Years
Payment Frequency	Monthly (12Xper year)
Mortgage Term	5 Years

Source: Draft by the Author

The mortgage payment plan indicates the total mortgage amount of $325,000 with the interest rate of 5.00% under 25 years of amortization period. The term of mortgage is fixed for 5 years. The borrower is making monthly payments of mortgage loan and every year 12 number of payments are required.

TABLE 11: Calculation Summary

Category	Term	Amortization Period
Number of Payments	60	300
Mortgage Payment	$1,890.22	$1,890.22
Prepayment*	0.00	0.00
Principal Payment	$37,350.60	$325,000.00
Interest Payments	$76,062.37	$242,064.86
Total Cost	$113,412.97	$567,064.86

Source: Calculated by the Author

Borrowers will have made 300 monthly (12x per year) payments of $1,890.22 and also have paid $325,000.00 in principal, $242,064.86 in interest, for a total of $567,064.86 over the 25-year of amortization period. The borrowers will have made 60 monthly (12x per year) payments of $1,890.22 and have paid $37,350.60 in principal, $76,062.37 in interest, for a total of $113,412.97 over the 5-year term. The borrowers will have a balance of $287,649.40 at the end of their 5-year term. *Note: The amount of prepayment made during the five (5) years Term and twenty-five (25) years of Amortization period respectively.

IV. RESEARCH FINDINGS

The descriptive study was designed to examine the influence of mortgage stress test on maximum loan approval amount. it also aimed to calculate the variances in repayments if monthly payment frequency is changed to bi-weekly payments. Another motive was to explain the difference a mortgage stress test makes on payment amount to pay off the debt. The study first of all finds the *Mean* value of sold properties as $440,494.84.

TABLE 12: Price of Sold Properties

Mean (Average)	440494.84054054
Median	418450
Range	1061000
Mode	374000, appeared 5 times
Largest	1272000
Smallest	211000
Sum	162983091
Count	370

Source: Calculated by the Author

The above calculations provide that there is no change in the payment frequencies for buyers who need default insurance when they put less than 20% down payment because under the new mortgage stress test banks must charge the higher interest rates either the five-year conventional mortgage rate announced by the bank of Canada or the rate of interest buyers have negotiated with lenders. The test requires the banks may charge either five-year conventional mortgage rate announced by the bank of Canada or the interest rate buyers have negotiated with the lender plus 2% extra for the borrowers who do not require default insurance (Govt. of Canada, 2019).

TABLE 13: Down Payment VS Mortgage Default Insurance

Asking Price $ 440,495				
Down Payment	5 %	10 %	15%	20%
	$22,025	$44,050	$66,074	$88,099
Amortization Years	25	25	25	25

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Mortgage Insurance	+$16,739	+$12,290	+$10,484	$0
Mortgage Required	$435,209	$408,735	$384,905	$352,396

Source: Calculated by the Author

According to the above analysis, the research finds that where the property price is $440,495 and borrowers put 20 % ($88,099) or more down payment to secure the loan of $352,396, they do not need to buy any mortgage default insurance however they would pay $10,484 for mortgage default insurance if the down payment is 15 % ($66,074) or less for the loan of $384,905. If borrowers put only 10 % ($44,050) down payment, they will be charged $12,290 for mortgage default insurance to get the loan amount of $408,735 and they would pay $16,739 for mortgage insurance when they put 5% ($435,209) down payment.

TABLE 14: Monthly Mortgage Amount under Stress Test

Description	Value 1	Value 2
Total Amount Needed	$440,495	$440,495
Mortgage Term (Years)	5.0	5.0
Rate of Interest	5.00%	3.00%
Amortization (Years)	25	25
Compounding	Monthly	Monthly
Monthly Payment	$2,575	$2,089
Term Interest Paid	$104,202	$61,485
Balance at Maturity	$390,191	$376,647
Interest in Amortization	$332,032	$186,168
Payment renewal in Rate rise 2%	$3,025	$2,486
Payment if Rate rise 3%	$3,264	$2,698
Difference of Payment against 2%	$450	$212

Source: Calculated by the Author

If a borrower needs the full loan of $440,495 on 5 % annual interest with 5 years' term and 25 years' amortization based on monthly compounding interest, the monthly mortgage payment would be $2,575. The monthly payment would be increased to $3,025 if the interest rate rises up to 2% and $3,264 monthly in case the interest rate rises up to 3%. The total amount of interest for the term would be $104,202 and balance at maturity would be $390,191. The interest amount in amortization would be $332,032 and borrowers make $450 extra every month when the interest rate goes up 2%. However, the monthly mortgage payment would be only $2,089 in normal situation when borrowers get a loan on simple 3% annual interest rate. The borrower would pay $2,486 if interest rate rise 2% and $2,698 every month in case the interest rate goes up 3%. The difference of amount between normal payments and after 2% increase would be $212 every month.

TABLE 15: Mortgage Payment Calculations (3%) interest

Principal	Annual Interest	Total Interest	Monthly Interest	Monthly Payment
$440,495	3 %	$186,168.14	$620.56	$2,088.88
Principal	Annual Interest	Total Interest	Biweekly Interest	Biweekly Payment
$440,495	3 %	$162,532.88	$281.20	$1,044.44

Source: Calculations by the Author

The table displays the difference of total amount a borrowers make to pay off the debt every year due to monthly and bi-weekly payment frequencies. Under 3% annual interest and 25 years' amortization, the monthly mortgage payment would be $2,088.88 (x 12) and every year $25,066.56 would be paid off. The borrowers pay $1,044.44 in each installments when they pick bi-weekly payment frequency but the total mortgage payments would be 26 instead of 24 as there are 52 weeks in a year. The borrowers pay back $27,155.44 every year which is $2,088.88 more than the monthly payment frequency.

TABLE 16: Mortgage Payment Calculations (5%) Interest

Principal	Annual Interest	Total Interest	Monthly Interest	Monthly Payment
$440,495	5 %	$332,031.97	$1,106.77	$2,575.09
Principal	Annual Interest	Total Interest	Biweekly Interest	Biweekly Payment
$440,495	5 %	$276,461.34	$496.34	$1,287.54

Source: Calculations by the Author

If the interest rate is 5%, the monthly payment would be $2,575.09 and borrowers would return $30,901.08 every year to lenders. The amount of payment is calculated as $1,287.54 where borrowers pick the bi-weekly payment frequency and they pay back $33,476.04 annually through 26 installments. The bi-weekly frequency helps to pay $2,574.96 more than the monthly payment frequency.

TABLE 17: Difference of Payment (Annually)

Principal Loan	Rate of Interest	Monthly Frequency	Bi-Weekly Frequency	Payment Difference
$440,495	3%	$25,066.56	$27,155.44	$2,088.88
$440,495	5%	$30,901.08	$33,476.04	$2,574.96

Source: Calculation by the Author

The table shows the payment amount difference in monthly and bi-weekly payment frequencies under 3% and 5% annual rate of interest.

V. DISCUSSION OF FINDINGS

The borrowers get less amount of mortgage funds and liable to pay off higher amount to loan when lenders apply "Mortgage Stress Test" formula to evaluate the affordability of applicants/borrowers. The procedure of approval is absolutely strict but in fact the borrowers, after approval of mortgage, will make the payments according to the agreed rate of interest with the lenders. It is true that mortgage stress test influences the maximum mortgage approval amount and increase the liability of payments. The amount of payment is not basically increased unless the actual rate of interest goes up. The high interest rate is only for the test purpose and it does not force lenders to sells their product on this rate. Lenders still can offer the lower rates than the criteria announced for stress test.

The examination focused on Affordability, Property Prices, Income, Mortgage Amount, Payments and Expenses (operating cost) as variables. The study also analyzed the payment variance and debt burden on borrowers based on monthly and bi-weekly payment frequencies. It is described that bi-weekly payment frequency make much difference to pay off the debt faster as compare to monthly frequency regardless of the rate of interest. The borrowers will pay off their mortgage quicker whether rate of interest is 3 % or 5 % when they choose a bi-weekly frequency.

According to the analysis based on our target price, the borrowers pay $2,088.00 every year under the annual rate of interest 3% and $2,574.96 where the interest rate is 5%.

Mortgage Stress Test does not make any difference in monthly payments and borrowers would pay according to the rate of interest agreed with lenders.

However, the stress test has no impact on the mortgage payment and frequencies. Borrowers can pay off the mortgage loan within the mortgage term without increasing the duration. The amount of remaining loan must be reduced because after making the higher payments of mortgage by the borrowers in bi-weekly frequency, the amount of loan debt gradually decreased on monthly basis. The study applied quantitative methods approach to conclude the research task and followed *Asymmetric Information Theory* which helped to explain the phenomenon in the appropriate manner. The research problem specified the situation of delinquency where at least one out of five deferred cases possibly lead to the mortgage default according to Canadian Bankers Association. As far as lending industry is concerned, Asymmetric Information Theory plays a vital role to make informed decisions in any financial transactions. Perhaps in the present situation, the affordability issues are also caused by job loss, reduce work and unemployment due to economic fallout of the coronavirus but the regulators might still provide the justification of Stress Test on Asymmetric Information grounds in the above scenario.

VI. CONCLUSION

Canada introduced a mortgage stress test in lending practice to evaluate the affordability of borrowers under high ratio of interest rates. Canadian Bankers Association also fears that numbers of possible mortgage default could be increased in current months but it is hard to say whether those borrowers took loans before or after 2018. The study examined the impacts of mortgage stress test on approval of maximum amount of loan, variance in repayments when monthly payment frequency is changed to bi-weekly and also the actual differences a stress test makes on payment amount to pay off the debt. The study followed the descriptive research methodology to answer all the three research questions. The paper finds that mortgage loan amount is definitely considered based on the stress test criteria and the bi-weekly payment frequency help to pay off the debt faster than monthly payment frequency. The study finds that there is no increase in payment amount after the approval of mortgage under stress test because the high interest rate is only used to evaluate the affordability of borrowers but actually they do not have to make payments on that criteria. Finally, the mortgage stress test could be a tougher procedure for approval but it does not require, in normal situations, to increase payment amounts while paying off the debt.

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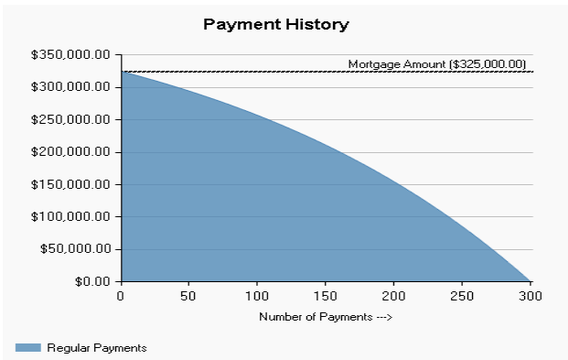
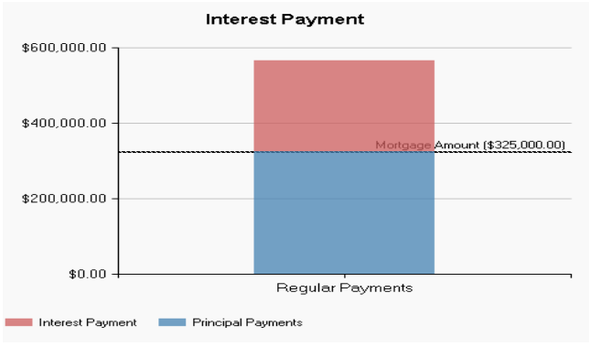
Appendices:

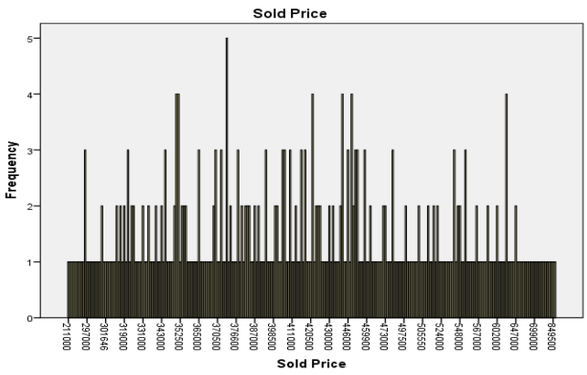
Note 1: The diagrams of the number of payments and loan interest required to pay off the mortgage within the prescribed amortization period of 25 years.



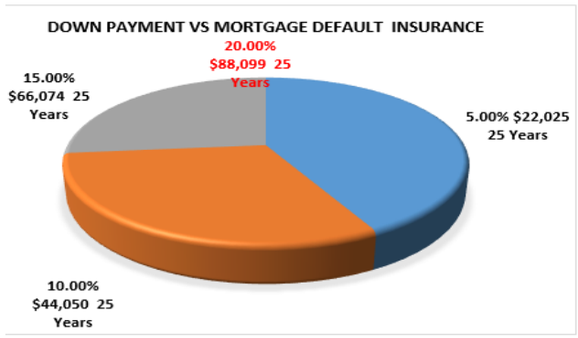
Note 2: The diagram of mortgage amount and monthly liability of mortgage including loan interest and principal payments.



Note 3- The figure of sold price of the properties



Note 4- The figure about requirement of mortgage default insurance for the residential properties based on the down payment put by the buyers.



Note 5- The table of mortgage and interest rate

Principal remaining

	5% Annual Interest, 25 Years Amortization		3% Annual Interest, 25 Years Amortization	
Year #	Standard	Biweekly	Standard	Biweekly
1	$431,412.40	$428,687.79	$428,479.00	$426,306.33
2	$421,865.12	$416,277.92	$416,097.52	$411,687.31
3	$411,829.39	$403,234.64	$403,339.44	$396,624.87
4	$401,280.20	$389,525.62	$390,193.32	$381,105.58
5	$390,191.30	$375,116.87	$376,647.34	$365,115.57
6	$378,535.07	$359,972.69	$362,689.36	$348,640.57
7	$366,282.49	$344,055.53	$348,306.82	$331,665.86
8	$353,403.04	$327,325.94	$333,486.83	$314,176.29
9	$339,864.65	$309,742.45	$318,216.07	$296,156.24
10	$325,633.62	$291,261.48	$302,480.84	$277,589.63
11	$310,674.50	$271,837.22	$286,267.00	$258,459.87
12	$294,950.04	$251,421.53	$269,560.01	$238,749.89
13	$278,421.08	$229,963.80	$252,344.86	$218,442.08
14	$261,046.48	$207,410.85	$234,606.09	$197,518.32
15	$242,782.95	$183,706.76	$216,327.78	$175,959.91

	5% Annual Interest, 25 Years Amortization		3% Annual Interest, 25 Years Amortization	
Year #	Standard	Biweekly	Standard	Biweekly
16	$223,585.03	$158,792.79	$197,493.51	$153,747.62
17	$203,404.91	$132,607.19	$178,086.39	$130,861.61
18	$182,192.34	$105,085.04	$158,088.98	$107,281.43
19	$159,894.48	$76,158.14	$137,483.33	$82,986.05
20	$136,455.83	$45,754.77	$116,250.94	$57,953.76
21	$111,818.02	$13,799.58	$94,372.74	$32,162.22
22	$85,919.68	$0.00	$71,829.10	$5,588.39
23	$58,696.34	$0.00	$48,599.77	$0.00
24	$30,080.20	$0.00	$24,663.90	$0.00
25	$0.00	$0.00	$0.00	$0.00